BY ORDER OF THE
SECRETARY OF THE AIR FORCE

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Flying Operations

C-5 OPERATIONS PROCEDURES

COMPLIANCE WITH THIS PUBLICATION IS MANDATORY

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This volume implements AFPD 11-2, *Aircraft Rules and Procedures*. It establishes policy for the operation of C-5 aircraft to safely and successfully accomplish their worldwide mobility missions. The use of the name or mark of any specific manufacturer, commercial product, commodity, or service in this publication does not imply endorsement by the Air Force. This instruction applies to Air National Guard (ANG) and Air Force Reserve (AFRC) units.

The Privacy Act of 1974 applies to certain information gathering pursuant to this instruction. The Privacy Act System Number F011 AF XO A, Air Force Operations Resource Management System (AFORMS) covers required information. The Paperwork Reduction Act of 1974 as amended in 1996 affects this instruction. Maintain and dispose of records created as a result of processes prescribed in this publication in accordance with AFMAN 37-139, *Records Disposition Schedule*.

This document is new and must be completely reviewed. This instruction contains references to the following field (subordinate level) publications and forms which, until converted to departmental level publications and forms, may be obtained from the respective MAJCOM publication office:

Publications: AMCI 11-208, 11-301, AMCMAN 11-211 (S), AMCPAM 11-2 and 55-25 (AMC).

Forms: AMC Form 41, 43, 54, 97, 196, 305, and 423 (AMC).

SUPPORTING INSTRUCTIONS

Chapter 1

GENERAL INFORMATION

1.1. General.

1.1.1. This AFI provides procedures for Air Force C-5 operations and applies to C-5 aircrews and all management levels concerned with operation of the C-5 aircraft mobility operations. It is a compilation of information from aircraft flight manuals, FLIP publications, and Air Force directives, as well as an original source document for many mobility areas. When specified as the reference, the source directive has precedence in the case of any conflicts, revisions, and matters of interpretation. For those areas where this AFI is the source document, waiver approval authority is in accordance with paragraph **1.4.** For those areas where this AFI repeats information contained in other source documents, waiver authority will be in accordance with these source documents.

1.1.2. All units and agencies involved in or supporting C-5 operations will use this AFI. Copies will be current and available to planning staffs from headquarters to aircrew level. Transportation and base operations passenger manifesting agencies will also maintain a copy of this AFI.

1.2. Applicability. This AFI is applicable to all individuals and units operating the C-5 aircraft.

1.3. Key Words Explained.

1.3.1. "Will" and "Shall" indicate a mandatory requirement.

1.3.2. "Should" is normally used to indicate a preferred, but not mandatory, method of accomplishment.

1.3.3. "May" indicates an acceptable or suggested means of accomplishment.

1.3.4. "Note" indicates operating procedures, techniques, etc., which are considered essential to emphasize.

1.4. Deviations and Waivers. Do not deviate from the policies and guidance in this AFI, except for safety, or when necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required. The aircraft commander is the ultimate authority and is responsible for the course-of-action to be taken. Report deviations or exceptions without waiver through channels to MAJCOM Stan/Eval function who, in turn, should notify the OPR (lead command) for follow-on action, if necessary.

1.4.1. Unless otherwise directed in this AFI, waiver authority for the contents of this document is MAJCOM/DO. MAJCOM/DO staff should forward a copy of approved waivers to the OPR (lead command). Request for a long-term (permanent) waiver must be approved by MAJCOM/DO and listed in MAJCOM supplement (see paragraph **1.5.**).

1.4.2. Short-notice waiver requests for missions in execution (including missions under TACC operational control) use **Chapter 4**, Waiver Protocol.

1.5. Supplements. This document is a basic directive. Each MAJCOM or operational theater may supplement this AFI according to AFPD 11-2, *Aircraft Rules and Procedures*. These supplements will not be less restrictive than the basic document. MAJCOM/DO may initiate a long-term waiver to basic document. Specify long-term waiver approval authority, date, and expiration date in the appropriate MAJCOM supplement. Limit supplement information to unique requirements only.

1.5.1. Combined Operations. Use only the basic AFI for planning or operations involving forces from lead and user commands. Commanders may use approved MAJCOM supplement procedures with assigned and/or chopped forces provided these forces receive appropriate training and duration is specified. Commanders should not assume or expect aircrews from another command to perform MAJCOM-specific procedures in their supplements unless these provisions are met. Forward questions by aircrew, planners, and staff to the OPR.

1.5.2. Coordination Process. Forward MAJCOM approved supplements (with attached Air Force Form 673, **Request to Issue Publication**) to HQ AMC/DOV, 402 Scott Dr, Unit 3A1, Scott AFB IL, 62225-5302. AMC/DOV will provide a recommendation to HQ AMC/DO and forward to HQ AFFSA/XOF for approval.

1.5.3. Before publication, units will send one copy of **Chapter 10** to the parent MAJCOM OPR for validation through their appropriate NAF for coordination and approval. Send final copy to HQ AMC/DOV, parent MAJCOM, and the appropriate NAF.

1.6. Requisition and Distribution Procedures. Unit commanders provide copies for all aircrew members and associated support personnel. This publication is available digitally on the Air Force WWW site at http://afpubs.hq.af.mil.

1.7. Improvement Recommendations. Send comments and suggested improvements to this instruction on AF Form 847, **Recommendation for Change of Publication**, through channels to HQ AMC/DOV, 402 Scott Drive Unit 3A1, Scott AFB IL, 62225-5302, according to AFI 11-215, *Flight Manual Procedures*, and the appropriate MAJCOM supplement.

1.8. Definitions. The explanation or definition of terms and abbreviations commonly used in the aviation community can be found in FAR Part 1; *DOD FLIP General Planning*, Chapter 2; and Joint Pub 1-02, *The DOD Dictionary of Military and Associated Terms.* See **Attachment 1** for common terms.

1.9. Aircrew Operational Reports. The reporting requirements in this instruction are exempt from licensing in accordance with paragraph 2.11.10 of AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections.*

Chapter 2

COMMAND AND CONTROL

2.1. General. Command and control of tanker and airlift forces is exercised through a network of command and control (C2) centers. C2 centers are executive agents for commanders exercising operational control over mobility forces. The C2 network consists of the AMC TACC, or respective MAJCOM C3 agency for MAJCOM (other than AMC) directed missions, theater Air Operations Centers (AOC), Air Mobility Elements (AME), unit C2s, Air Mobility Control Centers (AMCC), Tanker Airlift Control Elements (TALCE), Combat Control Teams (CCT), the Pacific Air Force (PACAF) and the United States Air Forces Europe (USAFE) Air Mobility Operations Control Center (AMOCC), Air National Guard Readiness Center (ANGRC) Command Center, and the Air Force Reserve Command (AFRC) Command Center.

2.2. Execution Authority. Execution approval will be received through the local command post or command element. The operations group commander will be the executing authority for local training missions. Missions operating outside communications channels will be executed by the aircraft commander.

2.2.1. Supplemental Training Mission (STM). Opportune airlift of cargo and mission personnel may be accomplished as a by-product of crew training missions. STMs may be authorized when minor adjustments can be made to a scheduled training mission or when a productive aircrew training mission can be generated for the airlift. The training mission will not be degraded in any manner to accomplish the STM. Use of STMs for logistical support will be authorized only when normal military or commercial transportation modes are unable to provide required support. STMs may be approved by the operations group commander with wing commander coordination. On STMs, aircraft commanders will release maximum number of space available seats commensurate with mission requirements and safety.

2.2.2. Off-Station Training Flights. Wing Commanders are the approval authority for off-station trainers. Prior to approval, commanders will carefully review each proposed trainer's itinerary to ensure it justifies and represents the best avenue for meeting training requirements. Commanders approving off-station trainers will forward a copy of the planned itinerary to the appropriate NAF/DO, MAJCOM/DOT or ANG/DOO, and TACC/XOB. Approval authority for AFRC UE off-station trainers is HQ AFRC/DOOM.

2.3. Aircraft Commander Responsibility and Authority. An aircraft commander is designated for all flights on the flight authorizations in accordance with AFI 11-401, *Flight Management*, and applicable MAJCOM supplement. Aircraft commanders are:

2.3.1. In command of all persons aboard the aircraft.

2.3.2. Responsible for the welfare of the crew and the safe accomplishment of the mission.

2.3.3. Vested with the authority necessary to manage crew resources and accomplish the mission.

2.3.4. The final mission authority and will make decisions not specifically assigned to higher authority.

2.3.5. The final authority for requesting or accepting any waivers affecting the crew or mission.

2.3.6. Charged with keeping the applicable C2 or executing agencies informed concerning mission

progress.

2.3.7. Responsible for ensuring that only activity authorized by the executing authority is accomplished, unless emergency conditions dictate otherwise. For example, unscheduled air refueling or transition training is not authorized without the approval of the executing authority.

2.4. Mission Clearance Decision. The final decision to delay a mission may be made either by the executing agency or the aircraft commander when conditions are not correct to start or continue a mission. Final responsibility for the safe conduct of the mission rests with the aircraft commander. If the aircraft commander refuses a mission, the mission will not depart until the conditions have been corrected or improved so that the mission can operate safely. Another aircraft commander and aircrew will not be asked to take the same mission under the same conditions.

2.4.1. Rerouting or Diverting a Mission. Must be authorized by the execution authority, except in an emergency or when required by en route or terminal weather conditions.

2.4.1.1. The controlling agency directing the rerouting or diversion is responsible for ensuring the aircraft is compatible with departure, en route, and destination requirement and facilities.

2.4.1.2. The aircraft commander will notify the appropriate command center of any aircraft or aircrew limitation that may preclude diverting or rerouting the mission.

2.4.2. When directing an aircraft to an alternate airfield, the C2 Center agency will ensure the aircraft commander is provided existing and forecast weather for the alternate, NOTAMs, and appropriate airfield information from the ASRR. If the planned alternate becomes unsuitable while en route, the aircraft commander will coordinate with the C2 Center for other suitable alternates. The C2 Center agency will coordinate with customs and ground service agencies to prepare for arrival. The C2 POC will be passed to the aircraft commander to facilitate feedback. The aircraft commander is the final authority on selecting a suitable alternate.

2.5. Aircrew Responsibilities. The aircraft commander is the focal point for interaction between aircrew and mission support personnel. The local C2 agency is the focal point for all mission support activities. Aircraft commanders must inform C2 of any factor that may affect mission accomplishment. When transiting a stop without a C2 agency, it is the responsibility of the aircraft commander to ensure necessary mission information is placed into the C2 system by the most expeditious means available. The aircraft commander will establish a point of contact with the appropriate C2 agency before entering crew rest.

2.6. Operational C2 Reporting. AMC C2 facilities will normally transmit arrival, departure, and advisory messages to the TACC, as appropriate. Aircrews on AMC TACC-controlled missions are responsible for transmitting these messages via L-Band SATCOM, HF, DSN, etc., when transiting stations without an AMC C2 (fixed or mobile) presence. Crews on missions not controlled by TACC will report to their appropriate controlling agency.

2.6.1. High Frequency (HF) Communications. HF is the primary means of worldwide C2 communications.

2.6.1.1. During operational missions, one HF radio shall be operated in automatic link establishment (ALE) mode to support voice contacts between the aircrew and TACC operations controllers. The radios are pre-programmed with ground station ALE addresses loaded in alphabetical order (by ground station ICAO identifier). TACC phone numbers are also programmed; M3 calls the TACC East cell and M4 calls the TACC West cell.

2.6.1.2. During transoceanic flights, the second HF radio shall be operated in manual mode and set to the appropriate ATC frequency. Place the radio in SELCAL, if available.

2.6.2. L-Band SATCOM. The L-Band SATCOM supplements HF communications by providing a worldwide communications capability suitable for *unclassified* C2 transmissions.

2.6.2.1. Employment. The L-Band SATCOM equipment aboard aircraft will be used as necessary except on local training missions and missions operating under emission control (EMCON) restrictions prohibiting its use. Limit SATCOM communications to operational traffic. The transceiver will be turned on during pre-flight and remain configured to receive messages at all times until aircraft power down at destination. For missions operating through sensitive or classified locations disable GPS position reporting in the normal message software and, when available, the automatic position reporting function.

2.6.2.2. Responsibility for equipment and supplies. Aircraft laptop computers are high theft items and will not be left unsecured on the aircraft.

2.6.2.3. Home station. Operations groups will be responsible for storing, maintaining day-to-day control, and administrative accountability of computers. Laptops will be issued via hand receipt to aircrews prior to departure from home base.

2.6.2.4. En route. When storing computers at en route locations, care must be taken to maintain original aircraft tail number and laptop computer match. Laptops may be secured aboard aircraft which have been modified with a suitable secure container (e.g. new gun box capable of holding weapons and computers), provided they will not be exposed to extreme temperatures (below -40 or above 149 degrees Fahrenheit). On aircraft lacking a suitable secure container or when temperature extremes cannot be avoided, computers will be stored in the command post or other suitable C2 facility. At locations without a C2 presence, crews should use their best judgment and store computers in the most secure facility or location available.

2.6.2.5 Staging Operations. Aircrews and C2 organizations will establish procedures to store and control the laptop computers. Control procedures should maintain original aircraft tail number and laptop computer match. Hand-to-hand crew transfer of the computer is the preferred method. If crew transfer is not possible, inbound crews will store the computer on the aircraft, if secure, and turn in the key to C2 before entering crew rest. If the aircraft lacks a secure container or if the temperature extremes in paragraph **2.6.2.4** cannot be avoided, the computer will be stored by C2. The C2 agency will issue the key or computer, as applicable, to outbound crews ensuring the aircraft/computer match is maintained.

2.6.2.6. L-Band SATCOM Messages and Advisories. The aircrew can send messages by either choosing a pre-formatted template from a menu or composing a free-text message. The following L-Band SATCOM transmissions are required as indicated:

2.6.2.6.1. On station message. At the beginning of each crew duty day, transmit an on station message during the initial pre-flight to verify system operation and update TACC with estimated aircraft takeoff times and other mission data. Further on station messages during the same crew duty day are not required.

2.6.2.6.2. Inbound 3-hour out messages. At locations with a mobile TALCE presence, the inbound aircrew will send a 3-hour out report to the TALCE.

2.6.2.6.3. Advisories. Transmit (free-text messages) mission delay, air refueling, off/on-load reports as required or directed.

NOTE:

The L-Band software acknowledged (A) status code indicates the message was received by the Land Earth Station (LES) and forwarded to TACC. The acknowledged code does not indicate the addressee received the message. If a confirmation is required, specifically request a reply message in the remarks field.

2.6.3. Stations Without C2 Agencies. Report movement information (actual time of departure [ATD], estimated time of departure [ETD], actual time of arrival [ATA], departure load data, delay information, etc.) directly to the AMC TACC (as appropriate) as soon as possible, by any means available. After takeoff, relay pertinent data to the appropriate C2 agency by any means available. L-Band SATCOM, when available, will be the preferred method for passing routine mission movement reports followed by voice communications (HF, DSN, etc.). The following L-Band SATCOM messages will be transmitted to fulfill mission reporting requirements:

2.6.3.1. Block out.

2.6.3.2. Departure message (Aircraft call sign, time of departure, mission status).

2.6.3.3. Arrival/Shutdown. The arrival portion should contain arrival time and any other information the aircrew deems necessary to pass to the TACC. If the L-Band SATCOM system is to be shutdown (crew rest, refueling, mission complete, etc.), inform the TACC that the aircraft can no longer receive messages.

NOTE:

For critical C2 communications, e.g., aircraft waiver request, voice communications (HF, DSN, etc.) are still the primary method with L-Band SATCOM as a backup.

2.6.4. Report movement information (departure, arrival, or diversion) and airlift mission recapitulation (recap) reports (number of passengers, pallets, tons of cargo, and special category information) to the appropriate C2 agencies via SATCOM or global HF stations. Provide relay instructions for global HF stations to pass reports to appropriate agencies.

NOTE:

All HF transmissions will be restricted to operational traffic, i.e. movement reporting, itinerary revisions, maintenance status, flight plan information, etc.

2.6.5. En Route Reporting. Full time connectivity between C-5 aircrews and the TACC is desired. Adhere to the following procedures:

2.6.5.1. Normal Operations. C2 agencies may advise aircrews via the controlling ATC agency to establish contact when communication is needed. Refer to the flight information publication (FLIP) concerning global HF station procedures in contacting MAINSAIL. Periodic "ops normal" calls or continuous monitoring of L-Band SATCOM or global HF station frequencies are not normally required. TACC may specify increased reporting procedures.

2.6.5.2. Operations Requiring Increased C2 Communications. TACC will specify increased reporting procedures (if needed) through a communications plan in the OPLAN, OPORD, FRAG, or Mission Directive. Aircrews will transmit L-Band messages or relay calls to global HF stations for

relay to the controlling C2 agency as specified in the communications plan. Maintain listening watch on L-Band or US Global HF system as specified in the communications plan.

2.6.6. Receiver Air Refueling Report (N/A local training missions which depart and arrive at home station). Report the air refueling information (in the standard format indicated below) to the destination AMC command and control element (if available) after landing. If a local AMC command post is not available, contact TACC/XOC (Hilda control) via HF radio or via land line (1-800-AIR-MOBL). AMC C2 will enter the information in the GDSS system for immediate retrieval. Include all scheduled air refuelings not accomplished. Use the following format:

2.6.6.1. AR Track.

2.6.6.2. Scheduled On-load.

2.6.6.3. Actual On-load.

2.6.6.4. Reason Code.

2.6.6.5. Additional Comments.

2.6.6.6. Reason Codes. Reason codes indicate the outcome of air refueling activity. Use Reason codes when a problem or situation affects the successful accomplishment of the air refueling. Crew should be prepared to provide a short synopsis of the factors impacting the air refueling.

2.6.6.6.1. RO - Receiver Operations.

2.6.6.6.2. RM - Receiver Maintenance.

2.6.6.6.3. RW - Receiver Weather.

2.6.6.6.4. TO - Tanker Operations.

2.6.6.6.5. TM - Tanker Maintenance.

2.6.6.6.6. TW - Tanker Weather.

2.6.6.6.7. AT - Air Traffic Control.

2.6.6.6.8. WEATHER - Air Refueling Track Adverse Weather.

2.6.6.6.9. AC - Air Refueling Complete.

NOTE:

Use reason code "AC" when air refueling was completed without delay or mission impact. Additional comments are mandatory if any reason code other than AT, WEATHER, or AC.

2.6.7. Arrival Advisory. Aircrews on operational missions transmit arrival advisory (using HF or L-Band) to the destination C2 agency or, in the absence of a local C2 agency, to TACC when approximately 2-3 hours from destination.

2.6.7.1. Furnish the following information:

2.6.7.1.1. Aircraft call sign.

2.6.7.1.2. Mission number.

2.6.7.1.3. ETB (estimated time in block).

2.6.7.1.4. Maintenance status (See the definitions for a list of maintenance status codes in **Chapter 1** of this AFI.). Aircrews on AMC missions transmit maintenance discrepancies (via VHF, UHF, HF, or L-Band SATCOM) to destination C2 Center or, in the absence of a local C2 Center, to the TACC as soon as possible. Crews should not wait until accomplishing the arrival message to call in this information.

2.6.7.1.5. Distinguished visitor (DV) status and honors codes (Transmit the DV code of each DV on board.). Do not pass the name of the DV on board without the consent of the DV. Outside the continental limits of the United States, the name of the DV will not be passed over non-secure radios.

2.6.7.2. Aircrews transmit a UHF or VHF arrival advisory as soon as contact can be established with the destination C2 agency. The following information should be furnished:

2.6.7.2.1. Aircraft call sign.

2.6.7.2.2. Mission number.

2.6.7.2.3. ETB.

2.6.7.2.4. Maintenance status.

2.6.7.2.5. DV code and requirements.

2.6.7.2.6. Number of passengers.

2.6.7.2.7. Hazardous cargo and remote parking requirements.

2.6.7.2.8. Additional service required.

2.6.7.2.9. Number of pallets to be downloaded and number that are through manifested.

2.6.7.2.10. Passenger and pallet space and weight available for the next mission segment.

2.6.7.2.11. Fuel Requirements.

2.6.8. DV Messages. Airborne unclassified messages originated by DV passengers may be transmitted at the discretion of the aircraft commander.

2.6.9. Maintenance Discrepancy Reporting. Aircrews on AMC missions transmit maintenance discrepancies (via VHF, UHF, HF, or L-Band SATCOM) to destination C2 Center or, in the absence of a local C2 Center, to the TACC as soon as possible. Crews should not wait until accomplishing the arrival message to call in this information.

2.7. Mission Commanders.

2.7.1. A mission commander will be required when more than two aircraft are assembled to perform missions away from home station. The unit tasked with command responsibility for the mission will designate an aircraft commander for overall mission responsibility, crew duties/crew rest permitting. When conflicts with crew responsibilities exist, or seven or more aircraft are involved, the mission commander will not be a primary crewmember.

2.7.1.1. For AMC-tasked missions, TACC/XOO will coordinate and designate a lead planning agency when more than one airlift unit is involved in an airdrop operation. This planning agency is responsible for coordinating the entire mission with all involved tanker (if applicable), airlift, user, and planning agencies. The lead planning agency will designate the mission commander. The mission

commander will be a rated (normally field grade) officer qualified in the type of mission being employed.

2.7.2. ANG and AFRC will determine mission commander for all missions involving ARC aircraft. All participating aircrews must be advised of the mission commander's identity.

2.7.3. It is essential that the mission commander be actively involved in all aspects of the mission, including planning, coordination, and execution.

2.7.3.1. Prior to entering crew rest for the mission, the mission commander will coordinate with the lead planning agency. During this coordination, the mission commander will review mission itinerary and receive points of contact for all participating aircraft and units.

2.7.3.2. The mission commander will ensure required mission briefings are completed by all aircrews. The mission commander and all available aircrew members will attend the pre-departure briefing. Ensure all takeoff, en route, air refueling, drop zone, special equipment, and recovery requirements are coordinated.

2.7.3.3. When non-collocated tankers and/or receivers are involved, the mission commander (in conjunction with the lead planning agency) will ensure all applicable information, to include rendezvous, abort, and recovery procedures, is relayed to the non-collocated aircrews. The mission commander will ensure the controlling agency and all non-collocated tankers and/or receivers are informed of all anticipated delays or mission changes.

2.8. C2 Agency Telephone Numbers. Units should publish a listing of telephone numbers to assist crews in coordinating mission requirements through appropriate C2 agencies. It should be made readily available to crews by publishing it in the Flight Crew Bulletin, Read File, or other appropriate publication.

2.9. Close Watch Missions. Close Watch missions are designated missions (e.g. CSAR, MEDEVAC, Phoenix Banner) which receive C2 special attention. Close Watch procedures are initiated so that all possible actions are taken to ensure on-time accomplishment and notification to the user when delays occur or are anticipated. Promptly notify the appropriate C2 channels of delays, aborts, or other events that affect on-time departure and advise them of the ETIC, new ETD, and ETA. Notify the C2 within 10 minutes of event and confirm that the user and OPR have been advised.

Chapter 3

CREW MANAGEMENT

3.1. Aircrew Qualification. Primary crewmembers or those occupying a primary position during flight must be qualified or in training for qualification for that crew position. If non-current, or in training for a particular event, the crewmember must be under the supervision of an instructor while accomplishing that event (direct supervision for all takeoffs, departures, air refueling contacts, approaches, and landings).

Exception 1: Senior staff members who have completed a Pilot Senior Officer Qualification Course and possess a current AF Form 8, **Certificate of Aircrew Qualification,** may occupy either pilot seat under direct IP supervision. These individuals will log "FP" for Flight Authorization Duty Code on the AFTO Form 781, **AFORMS Aircrew/Mission Flight Data Document**.

Exception 2: AETC pilots in the AETC Instructor Enrichment Program may fly under the direct supervision of a qualified FTU instructor. No simulated emergencies will be performed.

3.1.1. Pilots:

3.1.1.1. Missions With Passengers. With passengers on board, takeoff, climb-out, flight under actual instrument conditions, approach, and landing may be made by either the pilot or the copilot. Only a pilot that is qualified (valid AF Form 8) will occupy a pilot's seat with passengers onboard the aircraft. One of the following conditions must be met:

3.1.1.1.1. Two qualified, current and mission ready pilots must be at the controls. Aircraft commanders non-current for an overseas sortie may fly in command on operational CONUS missions.

3.1.1.1.2. A pilot regaining currency and an IP providing direct IP supervision must be at the controls. Pilots will not regain landing currency with passengers on board.

NOTE:

Although mission qualified, copilots on duty familiarization flights will be monitored by another qualified pilot in the observer's seat.

3.1.1.2. Touch-and-go landings with passengers are prohibited (N/A MAJCOM approved maintenance personnel).

NOTE:

MAJCOM approved maintenance personnel and civilian employees under direct contract to the DoD, engaged in official direct mission support activities, are considered mission essential and may be onboard when touch-and-go landings are performed. Touch-and-go landings with these personnel aboard should be limited to essential training requirements.

3.1.1.3. Aircraft commanders will only perform air refueling in the left seat. Air refueling may be performed in the right seat under direct IP supervision. MAJCOMs may develop a certification process to allow unsupervised performance of these maneuvers in the right seat.

3.1.1.4. Left Seat Training. Experienced copilots current and qualified in the right seat may be allowed to fly in the left seat under direct IP supervision. No passengers may be onboard.

3.1.1.5. Local Training Missions. Non-current or unqualified pilots must be under direct supervision

(in one of the pilot seats) of an instructor or flight examiner pilot during critical phases of flight.

3.1.2. Flight Engineers and Loadmasters. Non-current or unqualified flight engineers or loadmasters may perform in their primary crew position on any mission when directly supervised by a qualified instructor or flight examiner of like specialty. During cruise, a qualified second flight engineer may perform flight engineer duties while under the supervision of a first flight engineer.

3.2. Crew Complement. Total operating crew will not exceed 22. Minimum crew complement is as specified in Figure 3.1.

3.2.1. Minimum crew requirement for local flights is the same as for a basic crew. ***EXCEPTION***: Loadmasters are only required on locals carrying passengers or cargo.

3.2.2. Augmented crews are required when a mission cannot be safely completed within a basic FDP. Augmentees must be current and qualified in the aircraft. Non-mission-ready (NMR) crewmembers will not be used as augmentees. ***EXCEPTIONS:*** A NMR pilot (non-current, qualified) may be used as an augmentee provided the AC is a fully qualified, MR instructor and the NMR (non-current) pilot is regaining currency (e.g., overseas sortie). In those situations requiring augmentation, the crew must be augmented from the start of the duty period. MAJCOM/DO approval is required for additional crewmembers to join the mission en route for augmentation. If augmentees are added to the crew, the crew's FDP will be computed based on the FDP of the most limited person.

Figure 3.1. Minimum Crew Complement.

Crew Position	Notes (see below)	Basic	Augmented	Airdrop	SOLL II
Aircraft commander	1, 9	1	1	1	1
First pilot	1, 9		1		1
Copilot	1, 9	1	1	1	1
Navigator	9			1	2
Flight engineer	1, 2, 3, 9	2	2	2	2
Loadmaster	4, 5, 6, 7, 8, 9, 10	2	3	3	4

NOTES:
1. On AR missions, an aircraft commander and flight engineer will be AR-qualified. A copilot will be AR-trained.
2. One first and one second engineer (or higher) are required for a basic crew (minimum).
3. Two first engineers or higher are required for an augmented crew (minimum).
4. Two loadmasters required for all basic airlift missions (schedule three when resources are available) to include passenger loads up to 73 in the troop compartment.
5. One loadmaster required for all AR training missions with cargo or passengers on board.
6. When ten or less passengers are carried on local training missions, only one loadmaster is required.
7. When passengers are carried in the cargo compartment, additional loadmasters are required:
   - 1 to 30 passengers—1 loadmaster.
   - 31 to 88 passengers—2 loadmasters.
   - More than 88 passengers—3 loadmasters.
8. For airdrop missions, the loadmaster complement will be that required to accomplish the mission.
9. Special operations low-level (SOLL) II. The pilot will be a highly qualified air refueling aircraft commander (ARAC). The copilot will be an ARAC. The jumpseat will be an AR copilot. Both engineers will be SOLL II qualified and first engineers or higher. The aircraft commander, copilot, radar navigator, primary flight engineer, and primary loadmaster will be integral to the maximum extent possible.
10. The designated primary loadmaster should be at least a C-5 loadmaster journeyman on career status.

3.3. Scheduling Restrictions. Crewmembers will not be scheduled to fly nor will they perform crew duties:

3.3.1. When the maximum military flying time limitations of AFI 11-202V3, *General Flight Rules*, will

be exceeded.

3.3.2. After consuming alcoholic beverages within 12 hours of takeoff or when under the influence of alcohol. Do not takeoff early (prior to scheduled departure time) if the early takeoff time would violate these restrictions.

3.3.3. After consuming alcoholic beverages within the 12-hour period prior to assuming ALFA or BRAVO standby force duty.

3.3.4. Within 72 hours of donating blood. The flying unit commander must approve the donation of blood by crewmembers in a mobility assignment or who are subject to flying duties within this 72-hour period. Crewmembers should not normally donate blood.

3.3.5. When taking oral or injected medication unless individual medical waiver has been granted by the Command Surgeon. Crewmembers may not self medicate except IAW AFI 48-123, *Medical Examinations and Standards.*

3.3.6. The following is a partial list of medications that may be used without medical consultation:

3.3.6.1. Skin antiseptics, topical anti-fungals, 1 percent Hydrocortisone cream, or benzoyl peroxide for minor wounds and skin diseases which do not interfere with the performance of flying duties or wear of personal equipment.

3.3.6.2. Single doses of over-the-counter aspirin, acetaminophen or ibuprofen to provide analgesia for minor self-limiting conditions.

3.3.6.3. Antacids for mild isolated episodes of indigestion.

3.3.6.3. Hemorrhoidal suppositories.

3.3.6.4. Bismuth subsalicylate for mild cases of diarrhea.

3.3.6.5. Oxymetazoline or phenylephrine nasal sprays may be used by aircrew as "get me downs" should unexpected ear or sinus block occur during flight. These should not be used to treat symptoms of head congestion existing prior to flight.

3.3.7. Within 24 hours of compressed gas diving (including scuba), surface supplied diving, or hyperbaric (compression) chamber exposure and aircraft pressurization checks that exceed 10 minutes duration.

3.3.8. Within 12 hours after completion of a hypobaric (altitude) chamber flight above 25,000-feet. Personnel may fly as passengers in aircraft during this period, provided the planned mission will maintain a cabin altitude of 10,000-feet MSL or less. For altitude chamber flights to a maximum altitude of 25,000-feet or below, aircrew members may fly without delay as crewmembers or passengers if their cabin altitude does not exceed 15,000-feet.

3.4. Alerting Procedures. AETC crews flying local training missions will follow alert and crew release procedures in accordance with locally published guidance (i.e., **Chapter 10**).

3.4.1. Crew alerts will normally be 4+15 hours prior to scheduled takeoff time to allow 1 hour for reporting and 3+15 hours for mission preparation. **EXCEPTION**: Crew alerts for local training sorties will normally be 3+15 prior to takeoff. Self-alert procedures may also be used for normal local training missions.

3.4.1.1. Self alerting may be requested by the aircraft commander, but is not normally recommended

on operational missions to avoid potential crew duty limitations resulting from mission changes. Early alerting to provide additional reporting or mission preparation time is authorized when absolutely essential for mission accomplishment. Late alerting is also authorized; however, all requests for changes to standard alerting times must be coordinated through the appropriate C2.

3.4.1.2. If no controlling C2 agency is available, crews will self-alert.

3.4.1.3. With aircraft commander approval, loadmasters may be alerted early when loading requirements (i.e., outsized cargo and 9-2/9-4 cargo) dictate a need for early alerting but no more than 2 hours prior to the crew alert. If early alerting will be required, the loadmaster must be notified of that intent prior to entering crew rest. In no case should the loadmaster be alerted more than 1 hour prior to the commencement of actual cargo loading operations. Aircraft commander and C2 must consider that when the loadmaster reports early, the available flight duty period for the crew will be limited by the loadmaster's show time.

3.4.2. A crew will not be alerted until the aircraft is in commission or there is reasonable assurance that the estimated time in commission (ETIC) will meet the proposed takeoff time.

3.4.3. The aircraft commander may request Crew Enhancement Crew Rest (CECR) when he or she desires a later legal for alert time to normalize the crew work-rest cycle or enhance messing options immediately prior to crew alert. To minimize adverse effects on established schedules, aircraft flow, and capability, CECR requests should be of minimum duration and normally be limited to de-positioning legs. Send requests through C2 Center channels for approval decision. When requests are disapproved, the controlling C2 Center will notify the aircraft commander through C2 channels of the reason for disapproval. CECR is not an alternative to a 'safety-of-flight' delay and should not be used as such. If the AC deems extra crew rest is necessary for continued safe flight and mission accomplishment, the AC has the responsibility to declare safety of flight when the situation warrants, not after CECR is disapproved.

3.4.4. Aircrew release policy is as follows:

3.4.4.1. On the aircrew's initial entry or reentry into crew rest, the controlling C2 agency or aircraft commander (for self alerts) will establish an expected alert time. The crew will not be alerted or otherwise disturbed before this time except for emergencies.

3.4.4.2. The latest allowable alert time will be 6 hours after the expected alert time for all missions. If circumstances warrant, the aircraft commander may extend the window to a maximum of 8 hours. (When advised the crew will be deadheading, the aircraft commander may extend the window to 12 hours). ANG and AFRC crew members may extend the window as necessary to allow deadhead return to home station within Firm Scheduled Return Time (FSRT). The controlling C2 agency will not request the aircrew accept more than a 6 hour window.

3.4.4.3. If the controlling C2 agency determines a crew will not be alerted in the allowable time span, then at the time of determination (but no earlier than the crew's expected alert time) the controlling C2 agency will reenter the crew into crew rest of not less than 12 hours and establish a new expected alert time.

3.4.4.4. When the latest allowable alert time expires without being alerted, then:

3.4.4.4.1. The crew reenters crew rest of not less than 12 hours.

3.4.4.4.2. The aircraft commander will contact the controlling C2 agency to determine the new

expected alert time and establish a new latest-allowable alert time.

3.5. Stage Management:

3.5.1. Stage Posture. Stages operate on a directional basis. Alert sequence is as follows:

3.5.1.1. Crews requiring an emergency return to home station.

3.5.1.2. By the crew's scheduled return time (SRT). Returning stage crews will be prioritized by their SRTs.

3.5.1.3. Crews in stage over 48 hours.

3.5.1.4. Crews in sequence of arrival time.

NOTE:

If a stage crew is forced to return to crew rest because of a mission delay or abort, that crew becomes first out when legal for alert.

3.5.2. Mechanical Stage. Mechanical stages may be established by the C2 where no crews are staged. The stage is created when a mission is delayed or aborted and the crew goes into crew rest. Mechanically staged crews become first out in the same direction when legal for alert. An inbound crew may be bumped from the mission even though they have sufficient duty time remaining to complete that mission. ***EXCEPTION:*** ANG and AFRC crews flying unit-equipped (UE) aircraft should not normally be mechanically staged.

3.6. Crew Duty Time (CDT) and Flight Duty Period (FDP). CDT is the amount of time an aircrew may perform combined flight and ground duties. FDP is the time period between mission reporting and final aircraft engine shutdown. For planning purposes, CDT normally consists of FDP plus 45 minutes, not to exceed the maximum CDT. When post-flight duties exceed 45 minutes, CDT is FDP plus the time required to complete the post-flight related duties.

NOTE:

CDT/FDP for AFRC/ANG technicians includes both military duty and civilian work. It begins when the individual reports for his or her first duty period (military or civilian) and ends at engine shutdown at the end of the mission or series of missions.

3.6.1. CDT and FDP both begin 1 hour after alert. ***EXCEPTIONS:***

3.6.1.1. Self-alerts: CDT and FDP begin at scheduled or established mission reporting time.

3.6.1.2. ALFA standby: CDT and FDP begin when the crew is told to launch.

3.6.1.3. BRAVO standby: CDT and FDP begin when the crew shows for duty.

3.6.1.4. Crewmembers performing other duties prior to flight related duties: CDT and FDP begin when reporting for other duties.

3.6.1.5. Crewmembers alerted early to perform mission-related duties: CDT and FDP begin when reporting for these duties.

3.6.2. The length of FDP will be established by the mission directive or controlling C2 when the crew shows for duty and is briefed for the mission. FDP will not be extended to an augmented day after a basic FDP has begun regardless of crew composition. FDP will not be based on crew composition, but

rather on mission requirements.

3.6.3. FDP ends at engine shutdown following completion of the final mission segment.

3.6.4. Normally, CDT ends 45 minutes after engine shutdown at the end of the mission. If any crewmember must perform mission-related duties past 45 minutes, CDT does not end until that crewmember completes these duties. These duties include on or off loading, servicing, debriefing, mission planning, etc. Except when authorized by unit commanders at home station or deployed locations, crewmembers will not be used for post mission duties supporting other missions; i.e., crew loadmasters will not be used as loading supervisors for other aircraft. Post mission duties will not be performed after the maximum CDT has expired.

3.6.5. Basic Crew FDP:

3.6.5.1. Maximum FDP for a basic crew is 16 hours. The basic FDP is 12-hours without an operative autopilot pitch axis.

3.6.5.2. Maximum CDT for a basic crew is 18 hours. *For AETC:* CDT for training missions should not be scheduled to exceed 12 hours and will not exceed 14 hours.

3.6.6. Augmented Crew FDP:

3.6.6.1. Maximum FDP for an augmented crew (operational missions only) is 24 hours. FDP is 16 hours without an operative autopilot pitch axis. Only the pilot portion of the crew need be augmented when the autopilot is inoperative.

3.6.6.2. Basic crews will not be augmented after FDP has started.

3.6.6.3. Maximum CDT for augmented crews is 24+45 hours.

3.6.6.4. Authorized only for a maximum of four intermediate stops and when one of the following criteria is met:

3.6.6.4.1. At least two legs of 4 hours each.

3.6.6.4.2. At least one leg of 6 hours.

NOTE:

No more than two intermediate stops are authorized past 16 hours.

3.6.7. Training FDP:

3.6.7.1. Maximum FDP for training missions is 16 hours**. For AETC***:* AETC FTU training missions will not exceed 12 hours. **For ANG***:* IPs are restricted to a 12 hour FDP for local training missions.

3.6.7.2. Training events (transition, air refueling, airdrop, low level, and multiple threat avoidance approaches and departures) must be completed during the first 12 hours of the training FDP. This does not prevent missions from continuing to home station or deployed staging base single ship (for a full stop landing) once training events are accomplished (not to exceed 16 hours with an operative autopilot pitch axis). Training duty day begins at the start of CDT.

NOTE:

ARC crews may perform transition on C-5 training missions provided time from start duty does not exceed 16 hours and actual flight duty does not exceed 12 hours.

3.6.8. If the autopilot fails after departure, consider mission requirements and determine best course of action to preclude further mission delays due to reduced FDP. Best course of action may include divert to an airfield with maintenance capability. Contact C2, coordinate intentions, and comply with the preceding limitations upon reaching the next station.

3.6.9. Deadhead Time

3.6.9.1. Crewmembers may perform primary crew duties after deadheading if they will not exceed a basic FDP for the mission to be flown beginning at reporting time for the deadhead flight.

3.6.9.2. Crewmembers may deadhead following primary crew duties if they will not exceed an augmented FDP beginning at reporting time for primary crew duties.

3.6.10. CDT/FDP Extensions. MAJCOM/DO (AMC/DO for AMC directed missions through the TACC) is the waiver authority for all CDT/FDP extensions. Waivers are not normally authorized for missions under the operational control of the home unit (locals). If a waiver is required on a local mission due to urgent situational factors, the OG/CC is the waiver authority.

3.6.11. Flight examiners administering evaluations will not exceed an augmented FDP.

3.6.12. Tactical Airlift Missions. The following FDP restrictions apply to mission segments where tactical events are accomplished:

3.6.12.1. Single-ship FDP. Single-ship FDP is 16 hours provided no tactical or air refueling events are accomplished after 14 hours. An inoperative autopilot pitch axis limits FDP to 12 hours.

3.6.12.2. Augmented FDP is 24 hours providing no tactical or air refueling events are accomplished after 18 hours. An inoperative autopilot pitch axis limits FDP to 16 hours.

3.6.13. CDT for crewmembers performing pre-flight/loading duty is 12 hours.

3.7. Crew Rest. See AFI 11-202V3, and the following: Crewmembers will enter crew rest a minimum of 12 hours before alert time or, when self alerting, 12 hours before reporting time.

3.7.1. Home-Station Pre-departure Crew Rest. All primary and deadhead crewmembers should enter crew rest 24 hours prior to alert time for missions scheduled away from home station for more than 16 hours. Crewmembers may perform limited non-flying duties, including mission planning, during the first 12 hours of this period (***EXCEPTION***: ANG and AFRC according to AFI 11-202V3). OG/CC is waiver authority for the first 12 hours of pre-departure crew rest. Deadhead crewmembers will not be manifested as passengers to reduce or eliminate crew rest requirements. MAJCOM/DO is waiver authority for minimum 12-hour deadhead crewmember crew rest requirement.

3.7.2. En Route Crew Rest and Ground Time:

3.7.2.1. Crew rest normally begins 45 minutes after final engine shutdown. The 45-minute time period provides crews with time to complete normal post-flight duties. These duties include, but are not limited to, refueling, on and off loading of cargo, performing maintenance, or completing mission debriefings.

3.7.2.2. If any crewmember must stay at the aircraft past the 45-minute period, crew rest does not begin until post-flight duties are complete.

3.7.2.3. Minimum crew rest period is 12 hours. This period provides the crew a minimum of 8 hours of uninterrupted rest plus time for transportation, free time, and meals. The crew will not be

disturbed during this period, except during emergencies. Should the 12-hour crew rest period be infringed upon by official duties, the crew will re-enter crew rest for an additional 12 hours on completion of the official duties.

3.7.2.4. A minimum 17-hour ground time between engine shutdown and mission takeoff should normally be planned unless extended post-flight duties are anticipated.

3.7.2.5. The aircraft commander may modify normal ground time:

3.7.2.5.1. In the interest of safety.

3.7.2.5.2. To no less than 12 hours from the start of crew rest until mission reporting. Before reducing normal ground time consider mission preparation time, time to load cargo, and other factors peculiar to the mission. The controlling C2 agency will not ask the aircraft commander to accept less than a normal ground time. Waivers for exercises and contingencies are according to AFI 11-202V3.

3.7.2.5.3. To a maximum of 36 hours, when the crew has completed three consecutive near maximum FDPs.

NOTE:

Flight crews should be afforded crew rest times in excess of the minimum at en route stations, when possible, to give crews the opportunity to overcome the cumulative affects of fatigue while flying on several consecutive days or transiting several time zones.

3.7.3. Post-Mission Crew Rest (PMCR). PMCR is not applicable to ANG and AFRC crews**. (For AFRC:** supervisors will ensure AFRC crewmembers placed on progression tours for upgrade training will be given necessary down time between missions to attend to personal business.)

3.7.3.1. Crewmembers, returning to their home base, will be given sufficient time to recover from the cumulative effects of their deployed mission and tend to personal needs. PMCR begins immediately on mission termination.

3.7.3.2. Provide one hour of PMCR time (up to a maximum of 96 hours) for each 3 hours TDY when the duty exceeds 16 hours away from home station. This time is in addition to and will not run concurrently with pre-departure crew rest. (Not applicable to continuing missions.)

3.7.3.3. The OG/CC or acting representative is designated PMCR waiver authority and will not delegate this authority below the OG/CC level. Limit PMCR waivers to extraordinary circumstances only and do not use for day-to-day operations.

3.7.4. Crews will reenter crew rest if their aircraft or mission is not capable of departure within 4 hours from scheduled takeoff time for which they were alerted. Exceptions will be granted only with the concurrence of the aircraft commander (unit operations officer [DO] for ANG crews).

3.7.5. Flying Crew Chief Work and Rest Plan. The crew chief is responsible to the aircraft commander. The aircraft commander, in conjunction with the en route station chief of maintenance, will determine how long the crew chief can safely perform aircraft recovery actions. The crew chief must have the opportunity to sleep 8 hours in each 24-hour period. See AFI 21-101, *Maintenance Operations and Management Policy*, for detailed guidance.

3.7.6. Crew rest waivers approved for exercises and contingencies will be published in the OPORD,

OPLAN, or CONOPS.

3.8. Standby Force Duty.

3.8.1. Types of Standby Forces:

3.8.1.1. ALFA Standby Force. An aircraft and aircrew capable of launching in 1 hour and 30 minutes. Crewmembers are given 12 hours of pre-standby crew rest before or after aircraft pre-flight. Aircrews must complete all pre-flight duties within 6 hours of crew show time. An additional 12-hour pre-standby crew rest is required when pre-flight time exceeds 6 hours. Once an ALFA force is formed, additional pre-flights may be necessary to maintain the ALFA aircraft. Additional pre-flights done during normal waking hours do not interrupt crew rest. A crew will not stay on ALFA standby duty for more than 48 hours. After 48 hours, the crew must be launched, released, or entered into pre-departure crew rest. CDT begins when the crew is told to launch.

3.8.1.2. BRAVO Standby Force. An aircraft or aircrew capable of launching in 3 hours and 30 minutes (from the time the crew is told to launch). Crewmembers are given 12 hours of pre-standby crew rest. Crews are legal for alert after pre-standby crew rest. Pre-flight duties, if required, interrupt crew rest. A crew will not stay on BRAVO standby duty for more than 48 hours. After 48 hours, the crew must be launched, released, or entered into pre-departure crew rest. CDT begins when the crew shows for duty. If a crew is pre-flighting when the unit is tasked to launch the mission, CDT will begin when the crew first reported for that duty.

3.8.1.3. CHARLIE Standby Force. An identified aircrew capable of entering crew rest within 2 hours (after their controlling unit is notified). This aircrew would become legal for alert 12 hours after entering crew rest. Charlie alert will not exceed 72 hours. If retained for a 72-hour period, crewmembers will be released for 12 hours before resuming CHARLIE standby force duty, entering crew rest for mission, or entering pre-standby crew rest for ALFA or BRAVO standby force duty.

3.8.1.4. Wing Standby Forces. Standby forces are established by unit commanders. Crewmembers are given normal pre-departure crew rest. Standby duty time is limited to 12 hours. Crews will receive at least 12 hours of crew rest prior to another 12 hours of standby duty.

3.8.1.5. D-Alert—applicable to 436 AW-only. Alert aircrew will be provided 12 hours crew rest prior to alert duty. Alert crew may be considered in crew rest on termination of a flight, even though remaining on alert. If a crew completes a real world mission within the alert cycle, they are legal for alert after 12 hours of crew rest. The length of a D-alert tour will be determined by the unit commander, but it will not exceed 15 days.

3.8.1.5.1. D-alert crews will not be used as pre-flight crews for aircraft other than their designated aircraft to be used in case of launch.

3.8.1.5.2. D-alert crewmembers may complete ground currency events and limited office duties at their leisure while on alert; however, they will not accomplish those items that result in duty-not-including-flight (DNIF) status.

3.8.1.5.3. Flying on alert is authorized with the following restrictions:

3.8.1.5.3.1. At the discretion of the individual with a duty day of 8 hours.

3.8.1.5.3.2. Crewmembers fly for individual currency or SOLL II airdrop training. They are not in an instructor or examiner pool.

3.8.1.5.3.3. D-alert crew integrity is not required if recovery to Dover AFB or designated CONUS stage base can be accomplished within 3 hours of real world launch notification. If this cannot be met, D-alert crew integrity is required.

3.8.1.5.3.4. SOLL II training may be accomplished provided crewmembers are allowed to adjust their work or rest cycle.

3.8.1.5.3.5. Crew duty day for real world crisis response will begin when the crew shows for the real world mission.

3.8.2. Standby Force Crew Management:

3.8.2.1. Commanders will not use a standby crew to pre-flight other than their standby aircraft, or to do any non-mission duties while on standby.

3.8.3. Post-Standby Missions. On completion of standby duty, aircrew members may be dispatched on a mission.

3.8.3.1. Standby duty and pre-departure crew rest may be concurrent if notification is provided at least 12 hours prior to alert.

3.8.3.2. If started, post-standby crew rest must be completed before the start of pre-departure crew rest.

3.8.3.3. If an aircrew member is dispatched on a mission, compute the post-mission crew rest time on standby time plus mission time.

3.8.4. Post-Standby Crew Rest. Aircrew members not dispatched on a mission following standby duty will receive post-mission standby crew rest as follows:

3.8.4.1. If standby duty is performed away from normal quarters, crew rest time is computed from this standby time on the same basis as for mission time.

3.8.4.2. If standby duty was performed in normal quarters, no crew rest time is authorized.

3.8.5. ALFA Standby Aircraft Security. Each unit will complete maintenance and aircrew pre-flight inspections when they put an aircraft on ALFA standby status. The aircraft commander will ensure aircraft is secured before entering crew rest. Secure all hatches and doors to show unauthorized entry. Close and seal the crew entrance door with a metal boxcar seal or other controllable device that will prevent entry without damage to the door or lock. The command post must grant permission prior to persons entering an aircraft once the plane is sealed. Ensure standby aircraft is resealed any time the aircraft has been opened. The aircraft commander or designated representative must be present if access to his or her assigned aircraft is required.

3.9. Orientation Flights and Incentive Flights. Refer to DoD 4515.13-R, *Air Transportation Eligibility,* AFI 11-401, and the appropriate MAJCOM supplement.

3.10. Interfly.

3.10.1. Interfly is the exchange and/or substitution of aircrew members and/or aircraft between mobility units to accomplish flying missions. OG/CC, or as specified in the appropriate MAJCOM supplement (ANG use ANG/DO approval-level and AFRC use AFRC/DO approval-level) may authorize the interfly of assigned aircrews and/or aircraft. Normally, interfly should be limited to specific operations, exercises, or special circumstances but, may be used to relieve short-term qualified

manpower shortfalls. During contingencies, exercises, or designated “interfly” missions, interfly operations will be conducted under the following conditions or as specified in the OPLAN or CO-OPS.

3.10.2. When approved, interfly during normal day-to-day operations under the following conditions:

3.10.2.1. Aircraft ownership will not be transferred.

3.10.2.2. As a minimum, crews will be qualified in the MDS and model as well as systems or configuration required to fly the aircraft and/or mission.

3.10.2.3. During interfly, crew member (s) will follow "basic" operational procedures (see Combined Operations, paragraph 1.5.1.) and must thoroughly brief MAJCOM-Specific items.

3.10.2.4. Initiate interfly approval request by the unit or agency requesting the agreement by memo or message format to the OG/CC controlling the resource. Each commander involving resources (personnel or aircraft) (or MAJCOM, if appropriate) must concur with interfly proposal. Request must include details of the deployment or mission including; aircrew name(s), duration, or special circumstances.

3.10.2.5. Flight Mishap accountability is MAJCOM designated by PEID code for mishap aircraft.

3.10.2.6. Ground Mishap accountability in accordance with AFI 91-204, *Safety Investigations and Reports*.

Chapter 4

AIRCRAFT OPERATING RESTRICTIONS

Section 4A—General

4.1. Objective. The ultimate objective of the aircraft maintenance team is to provide an aircraft for launch with all equipment operational (Fully Mission Capable, FMC). Manpower limitations, skills, and spare part availability have a negative and direct impact on accomplishment. However, some redundant systems allow safe operation with less than all equipment operational for certain missions under specific circumstances. The aircraft commander, using the following policies, determines an aircraft's overall status. Use the following maintenance identifiers to effectively communicate an aircraft's status:

4.1.1. Mission Essential (ME). An item, system, or subsystem component essential for safe aircraft operation or mission completion will be designated ME in AFTO Form 781A, **Maintenance Discrepancy and Work Document**. Include a brief explanation of the reason for ME status in the AFTO Form 781A discrepancy block. An aircraft commander accepting an aircraft (one mission or mission segment) without an item or system does not commit that aircraft commander (or a different aircraft commander) to subsequent operations with the same item or system inoperative.

4.1.2. Mission Contributing (MC). Any discrepancies that are not currently ME, but may become ME (if circumstances change), are designated as MC in the AFTO Form 781A discrepancy block. Every effort will be made to clear the MC discrepancies at the earliest opportunity to the extent that maintenance skills, ground time, and spare part availability permit. . However, do not delay a mission to correct an MC discrepancy. If subsequently, in the AC's judgment, mission safety would be compromised by the lack of any component, the AC shall redesignate the said component as ME

4.1.3. Open Item. Discrepancies not expected to adversely impact the current mission or any subsequent mission are not designated MC or ME. These items receive low priority and are normally worked at home station.

4.2. Operating Restrictions Policy. It would be impractical to prepare a list that would anticipate all possible combinations of equipment malfunction and contingent circumstances. This chapter lists the equipment and systems considered essential for routine as well as contingency operations. The list does not necessarily include all equipment or systems essential to airworthiness (e.g. rudder, ailerons, elevators, flaps, tires, etc.). Those items which state a minimum requirement and have no listed exceptions are grounding items.

4.2.1. The aircraft commander is responsible for exercising the necessary judgment to ensure aircraft are not flown with multiple items inoperative that may result in an unsafe degradation or an undue increase in crew workload. The possibility of additional failures during continued operation with inoperative systems or components shall also be considered. This AFI is not intended to allow for continued operation of the aircraft for an indefinite period with systems/subsystems inoperative.

4.2.2. If, after exploring all options, an aircraft commander determines a safe launch is possible with an item inoperable (beyond a particular restriction) the aircraft commander shall request a waiver. Use C2 channels to notify the appropriate execution agency of intentions. Plan a minimum 1-hour response to the waiver request.

4.3. Waiver Protocol. Waiver to operate with degraded equipment or waiver to USAF policy exceeding this AFI may be granted on a case-by-case basis and only in exceptional circumstances.

Waiver authority is based on "who" has operational control and execution of the aircraft performing a specific mission. The aircraft commander determines the need for a waiver and initiates the request.

4.3.1. Local Missions (executed by unit OG/CC or equivalent). Waiver authority for active duty and associate/reserve units flying local missions is the active duty OG/CC or equivalent. For Unit Equipped (UE) ARC units, waiver authority is the OG/CC or equivalent.

4.3.2. AMC-Directed Missions. Waiver authority for active duty and AFRC or ANG units flying AMC or AMC-directed missions controlled by the AMC/TACC (includes HQ AMC Operational Readiness Inspections) is HQ AMC/DO. HQ AMC/DOV personnel are the authorized agent and maintain 24-hour watch through the appropriate TACC cell (East or West).

4.3.3. Other Missions (Contingencies). Waiver authority is listed in the OPORD/Tasking Order, etc., or is the DIRMOBFOR (or equivalent) for the agency with C2 of the aircraft. Crewmembers may request additional assistance or confirmation from their home units or MAJCOM/DO through the TACC, or as specified in MAJCOM Supplement.

4.3.4. ARC-Directed Missions (executed by the ANG or HQ AFRC). The appropriate ARC headquarters maintains C2 and waiver authority for ARC crews performing any ARC-directed mission prior to mobilization (except associate ARC units); waivers must be obtained from ANG/XO or HQ AFRC/DO, as appropriate.

4.3.5. Non-AMC Missions. For user command assigned aircraft according to Air Force Policy Directive (AFPD) 10-9, (e.g., AETC, AFRC, ANG) waiver authority is the appropriate MAJCOM/DO, or as specified in MAJCOM supplement.

4.4. Technical Assistance Service. At anytime in the decision process, the aircraft commander may request technical support and additional assistance from their home unit, MAJCOM staff, and maintenance representatives (HQ AMC/LG, ANGRC/LG, AFRC/LG or MAJCOM/LG). See **Chapter 10**, Local Operating Procedures, for the appropriate telephone numbers.

4.4.1. Aircraft commanders electing to operate with degraded equipment or aircraft systems (with appropriate waiver) must coordinate mission requirements (e.g., revised departure times, fuel requirements, maintenance requirements) with the controlling C2 agency prior to flight.

4.4.2. When it is necessary to protect the crew or aircraft from a situation not covered by this AFI and immediate action is required, the aircraft commander may deviate from the MEL and this chapter. Report deviations (without waiver) through channels to appropriate MAJCOM/DO within 48 hours. Units must be prepared to collect background information and submit a follow-up written report upon request.

4.5. Supplements. Not used.

4.6. C-5 MEL Column Identifiers.

4.6.1. Installed - Number of Components/Systems Installed. Number of components/systems normally installed on the C-5. Some exceptions apply to the Space Cargo Modification (SCM) models.

4.6.2. Required.

4.6.2..1 A - Home Station C-5 Maintenance Base. A location where full-time C-5 maintenance and supply capability exists. These bases include: Altus AFB, Dover AFB, Kelly AFB, Stewart Intl, Travis AFB, and Westover ARB. The requirements listed in this column are the minimum required to

depart any of the above locations regardless of the aircraft/crew's unit of assignment.

EXCEPTION 1: Aircraft transiting a Column A base (not their home station) on a depostitioning leg, may continue to home station operating under Column C.

EXCEPTION 2: During designated continquencies, Column C criteria will apply.

4.6.2.2. B - Home Station Local Flights. A location where full-time C-5 maintenance and supply capability exists as in Column A, but the requirements listed are the minimum required to complete a local training mission.

4.6.2.3. C - En Route C-5 Maintenance Base. An en route location where enhanced C-5 maintenance "repair capability" exists. Such a station has the necessary skilled USAF or USAF-contract maintenance personnel, support equipment and technical data available to accomplish most minor and major repairs. En route locations with a Maintenance "repair capability" include: RAF Mildenhall, Ramstein AB, NAVSTA Rota, Elmendorf AFB, Andersen AFB, Yokota AB, Kadena AB, and Hickam AFB. During contingency/exercises additional "repair capablility" locations may be established, where appropriate. Lack of replacement or spare parts does not necessarily constitute lack of en route support capability. Common sense and good judgment must be used by all concerned when determining minimum equipment requirements to preclude adverse operational impact or excessive maintenance support requirements. In those rare instances where lack of replacement parts or qualified personnel would create excessive ground times, the aircraft commander may request a waiver to operate under column D.

EXCEPTION 1: If a malfunction component has been carried through a Column D base, the aircraft transiting a Column C base, listed above, on a depositioning leg to home station, **may** continue the mission operating under Column D.

EXCEPTION 2: During designated continquencies, Column D criteria will apply.

4.6.2.4. D - Limited C-5 Operating Location. These are en route locations with limited or no C-5 maintenance personnel and supplies. These locations may accomplish minor repairs but require a Maintenance Recovery Team (MRT) or parts for major repairs.

4.6.3. Remarks/Limitations/Exceptions Column. Verbiage in this column must be applied to the appropriate column as depicted.

Section 4B—C-5 Minimum Equipment List (MEL)

4.7. MEL Policy. This section lists the minimum equipment and systems to launch the aircraft under normal (peacetime) conditions. The MEL represents MAJCOM restrictions only and does not include all equipment or systems essential to airworthiness. The MEL is not intended to promote continued operation of the aircraft for an indefinite period with systems/subsystems inoperative. See Section 4A for further information including objectives, policy, and waiver protocol.

4.7.1. System components required to complete emergency procedures and associated warning systems will be operational. All emergency equipment will be installed unless specifically exempted by mission requirements/directives (e.g., depot inputs with minimum survival kits).

4.8. Aircraft Model Identification. This attachment applies to the C-5A, B, and C-5A (SCM) model aircraft.

Table 4.1. Engines/Auxiliary Power Unit (APU).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
1-1. Engine Fuel Pump	4	4	4	4	3	**(D)** One-time flight to nearest repair base if only low-pressure element is inoperative with both affected fuel tank boost pumps operational.
1-2. Continuous Ignition	4	4	4	4	4	
1-3. Start Ignition	4	4	4	4	4	**(A, B, C, D)** Either Normal or Airstart position shall be operational.
1-4. Starter	4	4	4	4	4	
1-5. Fuel Heater	4	4	3	4	3	**(B, D)** Not required on flights with fuel temperature above 0° C. Valve must be failed closed.
1-6. Oil Pressure Indicating System						
a. Low Oil Pressure Switch	4	4	3	3	3	**(B, C, D)** The low oil pressure light may be inop if the oil pressure gauge is operative.
b. Low Oil Pressure Gauge	4	4	4	4	4	
1-7. Oil Temperature Indicator	4	4	4	4	4	
1-8. Oil Filter Differential Pressure Light	4	4	4	4	4	**(A, B, C, D)** Mission may continue if malfunction is determined to be an indication problem and the oil filter has been checked for clogging or indication of bearing failure (metal chips). The engine oil filter shall be checked at every stop until the indication malfunction is corrected.
1-9. N1 Indicator	2/ Eng	2/ Eng	2/ Eng	1/ Eng	0	**(C)** Operative indicator shall be placed on engineer's panel for MADAR vibration detection. N2 must be operative. **(D)** One-time flight to a repair base. N2 must be operative.
1-10. N2 Indicator	2/ Eng	2/ Eng	2/ Eng	1/ Eng	0	**(C)** Operative indicator shall be placed on engineer's panel for MADAR vibration detection. N1 must be operative. **(D)** One-time flight to a repair base. N1 must be operative.
1-11. TIT Indicator	2/ Eng	2/ Eng	2/ Eng	1/ Eng	1/ Eng	**(C, D)** Operative indicator shall be placed on engineer's panel for MADAR engine monitoring and overtemp.
1-12. FUEL FLOW Indicator	2/ Eng	2/ Eng	2/ Eng	1/ Eng	1/ Eng	**(C, D)** Operative indicator shall be placed on engineer's panel for proper FSAS operation.

Table continued on next page.

Table 4.1. Engines/APU (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
1-13. Engine Overheat & Fire Detection System	4	4	4	4	4	**(B, C, D)** System shall be capable of detecting both an engine fire and/or overheat condition. 1. Do not take off with a shorted system. 2. Do not take off if more than one open circuit exists and/or the location of the break cannot be accurately determined. Fire and ovht detection exists except between location of "opens." Take off at crew discretion from nonrepair base only after inspection reveals exact location of break/breaks and it can be determined that sufficient fire detection monitoring is available. 3. Take off only if fire warning and ovht test is operative. If a short develops, a false fire warning signal would be indicated resulting in an unnecessary engine shutdown.
a. Engine Fire Annunciator/Warning Lights	8	8	8	8	8	
b. Engine Overheat Annunciator/Warning Lights	8	8	8	8	8	
c. Engine/Pylon Optical Fire Detection System	4	4	4	4	0	**(D)** May take off from nonrepair base only if fire, ovht, and short discriminator tests are fully operable.
1-14. Engine Fire Extinguishing System						
a. Engine Fire Handles	4	4	4	4	4	**(A, B, C, D)** Handles shall be fully capable of automatic isolation of system components as outlined in 1C-5A-1. If the fire warning light is inoperative in the handle, the associated annunciator light shall be operable at both the pilot and flight engineer position.
b. Bottle Out Lights	4	4	4	3	3	**(C, D)** En route with no maintenance, if cockpit indicator is inop, check the pressure gauge on the bottle. One-time flight to repair facility authorized.
c. Fire Extinguisher Bottle	4	4	4	4	4	**(B, C, D)** All four bottles required for flight. A squib assembly can be obtained from either APU fire bottle. Remove the squib designated "alternate."
d. Fire Extinguisher Discharge Buttons	4	4	4	4	4	**(A, B, C, D)** Shall be capable of firing bottles.
e. Fire Extinguisher Bottle Select Switches	2	2	2	2	2	**(A, B, C, D)** Both Normal and Alternate positions shall be fully operable.

Table continued on next page.

Table 4.1. Engines/APU (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
1-15. Thrust Reversers	4	4	4	2	2	**(C, D)** May only be deactivated in symmetrical pairs IAW T.O. 1C-5A-2-4. Verify all actuators are attached to the translating cowl and that all locks are locked prior to deactivation. No thrust reverser may be deactivated if any hydraulic actuator leaks beyond limits. Mission may continue (to include en route stops) to the next repair capable base after deactivation of the TR system on #1 and #4. Deactivation of #2 and #3 systems may only be accomplished for a one-time flight to a repair capable base, and is restricted to FL250.
a. THRUST REV PRESSURE lights	4	4	4	4	2	**(D)** Thrust reversers must be deactivated as described above.
b. TH REV N LKD lights	4	4	4	4	4	
c. TH REV EXTD lights	4	4	4	4	4	
1-16. Engine Cowl "Blowout" Doors	2/eng (8 total)	8	8	8	8	
1-17. Engine Anti-Ice	4	4	4	4	4	**(A, B, C, D)** Both engine and nacelle anti-ice required for flights into forecasted icing conditions.
1-18. Auxiliary Power Unit (APU)	2	2	1	1	1	**(B, C, D)** Refer to T.O. 1C-5A-1, Section II, for operation with single APU operation. APU CONTROL circuit breaker shall remain closed.
1-19. APU Bleed Valves	2	2	1	1	1	**(B, C, D)** Required for each operational APU.
1-20. APU Isolation Valves	2	1	1	1	1	**(A, B, C, D)** If one APU Iso valve is inoperative, both APUs shall be capable of providing bleed air. If valve is failed closed to the respective APU, the APU bleed valve shall be operative to supply bleed air for the ATM and the other APU shall be capable of supplying bleed air and electrical power IAW T.O. 1C-5A-1, Section II. If the valve is failed open, the respective APU bleed valve shall be operational.
1-21. APU Isolation Valve Open Light	2	2	0	0	0	**(B, C, D)** Valve operation shall be confirmed prior to departure.
1-22. APU Fire Warning System	2	2	2	2	1	**(D)** If nonfunctional on one side, do not operate APU or ATM on that side unless a fire guard is present.
1-23. APU Fire Bottles	2	2	2	1	1	**(C, D)** For ground operations, limit operations to one APU and its associated ATM unless a fire guard is present.

Table continued on next page.

Table 4.1. Engines/APU (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
1-24. APU Exhaust Gas Temperature (EGT) Indictor	2	2	1	1	1	**(B, C, D)** Shall be operational on any APU that is planned to be operated.
1-25. APU Door Open Light	2	2	1	1	0	**(B, C)** Shall be operational on any APU that is planned to be operated. **(D)** Confirm door is closed before departure.
1-26. APU Start Light	2	2	1	1	0	**(B, C)** Shall be operational on any APU that is planned to be operated. **(D)** Starting will be closely monitored by the scanner.
1-27. APU On Speed Light	2	2	1	1	0	**(B, C)** Shall be operational on any APU that is planned to be operated. **(D)** Verify on speed by checking APU generator frequency.

Table 4.2. Bleed Air, Environmental, Etc. Systems.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
2-1. Air Conditioning Pack	2	2	1	1	1	**(B, C, D)** One pack may be inoperative if floor heat is operative and aircraft is capable of maintaining pressurization. **(D)** Due to increased structural fatigue, if both packs are inoperative, aircraft is limited to one-time unpressurized flight below 10,000 with MAJCOM approval.
2-2. Air Conditioning Master Switch	1	1	1	1	1	(**A, B, C, D**) Shall have control of air conditioning packs.
2-3. Air Conditioning Overheat Light	2	2	1	1	1	**(B, C, D)** Required for each operating pack.
2-4. Air Conditioning Overheat Sensor	2	2	1	1	1	(**B, C, D**) Required for each operating pack.
2-5. Airflow Selector Switch	1	1	1	1	1	**(B, C, D)** May be electrically inoperative provided valves can be manually positioned.
2-6. Compartment Temperature Indicators	3	3	2	0	0	**(B, C, D)** Unmanned compartments shall be monitored for proper temperature and close troop comp shutoff valve.
2-7. Flight Station Temp Control	1	0	0	0	0	**(A, B, C, D)** May be electrically inoperative provided temperature control valve can be positioned manually or with the beeper switch.
2-8. Relief Compartment Temp Control	1	1	0	0	0	**(B, C, D)** May be electrically inoperative provided temperature control valve can be positioned manually or with the beeper switch.

Table continued on next page

Table 4.2. Bleed Air, Environmental, Etc. Systems.(Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
2-9. Cargo Temperature Control System	1	1	0	0	0	**(B, C, D)** May be electrically inoperative provided temperature control valve can be positioned, manually or using the beeper switches.
2-10. Troop Compartment Shutoff Valve	1	1	0	0	0	**(B, C, D)** May be electrically inoperative provided control valve can be positioned manually.
2-11. Troop Compartment Temp Control	1	1	0	0	0	**(B, C, D)** May be electrically inoperative provided temperature control valve can be positioned manually or with the beeper switch.
2-12. Cooling Air Exit Door	2	2	1	1	1	**(B, C, D)** Required for operating air conditioner.
2-13. Cooling Air Exit Valve	2	2	1	1	1	**(B, C, D)** Required for operating air conditioner.
2-14. Cooling Fan	2	2	1	1	0	**(B, C, D)** If valve failed closed, do not operate the affected system on the ground, with slats extended, or below .3 Mach.
2-15. Cooling Fan Control Valve	2	2	1	1	1	**(B, C, D)** Do not operate the affected system on the ground, or with slats extended, or below .3 Mach if valve failed closed.
2-16. Primary Heat Exchanger High Limit Sensor	2	2	1	1	1	**(B, C, D)** Required for operating pack.
2-17. Primary Heat Exchanger Temperature Control Sensor	2	2	1	1	1	**(B, C, D)** Required for operating pack.
2-18. Flow Control and Shut-off Valve	2	2	1	1	1	**(B, C, D)** Required for each operating Air Conditioner Pack
2-19. Low Limit Temperature Control Sensor	2	2	0	0	0	**(B, C, D)** May be electrically inoperative if manual control of the low limit temperature control valve is available.
2-20. Low Limit Temperature Control Valve	2	2	0	0	0	**(B, C, D)** May be inoperative if manual control is available.
2-21. Diverter Valve	1	1	0	0	0	**(B, C, D)** May be electrically inoperative provided it can be manually positioned.
2-22. Alternate Air Valve	1	1	1	1	1	**(A, B, C, D)** May be electrically inoperative provided it can be manually positioned.
2-23. Aux Vent Valve	1	1	1	1	0	**(D)** One-time flight to repair base.
2-24. Automatic Pressure Controller	1	1	0	0	0	**(B, C, D)** Automatic may be inoperative provided manual mode is fully operational
2-25. Bleed Duct Ovht System	3	3	3	3	3	

Table continued on next page.

Table 4.2. Bleed Air, Environmental, Etc. Systems (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
2-26. Bleed Air Shutoff Valve	4	4	4	4	4	
2-27. Bleed Air Shutoff Valve Indicator Light	4	4	2	2	2	**(B, C, D)** One may be inoperative per wing, provided valve can be checked for proper operation during bleed down check. **(B, C, D)** To verify operation with APU supplying pressure, turn on engine anti-ice with pylon bleed air shutoff valve in the open position and look for a pressure drop, then close valve while looking for pressure increase.
2-28. Pressurization System	1	1	1	1	0	**(D)** Unless directed by other chapters of this instruction (e.g., airdrop) the aircraft will not be flown unpressurized. If inop, one-time flight to repair facility, not to exceed FL100.
2-29. Manual Pressure Controller	1	1	1	1	0	**(D)** Shall be operative for pressurized flight. One-time flight to repair facility, not to exceed FL100. Outflow and Thrust Recovery valves must be open.
2-30. Outflow Valve Indicator	1	1	1	1	0	**(D)** Cabin rate of climb and differential pressure indicator shall be operative.
2-31. Outflow Valve/Thrust Recovery Valve	1	1	1	1	0	**(D)** Shall be operative for pressurized flight. One-time flight to repair facility, not to exceed FL100. Outflow and Thrust Recovery valves must be open.
2-32. Cabin Mode Selector	1	1	1	1	1	
2-33. Cabin Low Press Light	1	1	1	1	0	**(D)** If inoperative, cabin altimeter/differential pressure indicator shall be operative for flights above 10,000 MSL.
2-34. Cabin Rate of Climb Indicator	1	1	1	1	0	**(D)** Required for manual pressurization. If inoperative and automatic pressurization is also inoperative, one-time flight to repair facility, not to exceed FL100. Outflow and Thrust Recovery valves must be open.
2-35. Emergency Depress System	1	1	1	1	1	
2-36. Floor Heat System	1	1	0	1	0	**(B, D)** If only one pack is operating then floor heat system is required. If inoperative then both packs shall be operative for pressurized flight. **(D)** Shall be operational if cargo requires temperature-controlled environment.
2-37. Floor Heat Duct Anticipator	2	2	2	2	2	
2-38. Manifold Bleed Air Pressure Indicator	1	1	1	1	1	
2-39. Pressure Aug Valves	4	4	3	3	0	**(B, C, D)** May be failed closed.
2-40. Pressurization Mode Selector Switch	1	1	1	1	0	**(D)** Manual Mode must be operative for pressurized flight. If inoperative, one-time flight to repair facility, not to exceed FL100. Outflow and Thrust Recovery valves must be open.

Table continued on next page.

Table 4.2. Bleed Air, Environmental, Etc. Systems (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
2-41. Start Valve Open Light	4	4	4	4	4	
2-42. Temp Aug Valves	4	4	4	4	4	**(A, B, C, D)** May be inoperative (failed closed) for operation in non-icing conditions.
2-43. Wheel Well Isolation Valve	1	0	0	0	0	**(A, B, C, D)** Shall be able to manually close the valve.
2-44. Wing Isolation Valves	2	2	1	1	1	**(B, C, D)** Operational valve will be closed during bleed duct overheat procedures until malfunctioning valve can be manually closed.
2-45. Safety Valves	2	2	2	2	0	**(D)** Fully operational for pressurized flight. If inop, one-time flight to repair facility only, not to exceed FL100.
2-46. Pitot Heat Systems	2	2	1	2	1	**(B, D)** One system may be inop for flights in non-icing conditions in VMC. **(A, B, C, D)** Both systems required for flights through Reduced Vertical Separation Minimums (RVSM) airspace.
2-47. AOA De-ice	4	2	2	2	2	**(A, B, C, D)** One system shall be fully operational. Associated stallimiter must also be operational.
2-48. Windshield Heat	3	3	3	2	1	**(C)** Adequate windshield heat should exist for at least 2 of 3 front flight station windshields. **(D)** Pilot's windshield heat shall be operational for one-time flight to nearest repair facility.
2-49. Windshield Wiper	2	2	0	1	0	**(B, D)** At least one system shall be operational for flights into forecast precipitation at arrival or departure.
2-50. Total Temp Probe	2	2	2	2	2	

Table 4.3. Hydraulics.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
3-1. Hydraulic System #1	1	1	1	1	1	**(A, B, C, D)** Will be pressurized for flight.
3-2. Hydraulic System #2	1	1	1	1	1	**(A, B, C, D)** Will be pressurized for flight.
3-3. Hydraulic System #3	1	1	1	1	1	**(A, B, C, D)** Will be pressurized for flight.
3-4. Hydraulic System #4	1	1	1	1	1	**(A, B, C, D)** Will be pressurized for flight.
3-5. 1-2 Power Transfer Unit (PTU)	1	1	1	1	0	**(D)** May be inoperative but, #1 system ATM shall be operative and all engine-driven pumps operational.
3-6. 2-3 Power Transfer Unit (PTU)	1	1	0	0	0	**(B,C, D)** May be inoperative but 1-2 and 3-4 PTUs shall be operative and all engine-driven pumps operational.

Table continued on next page.

Table 4.3. Hydraulics (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
3-7. 3-4 Power Transfer Unit (PTU)	1	1	1	1	0	**(D)** May be inoperative but #4 system ATM shall be operative and all engine-driven pumps operational.
3-8. ATM "ON" Light	2	2	2	2	2	
3-9. Air Turbine Motor (ATM)	2	2	1	2	1	**(B, D)** Applicable PTU shall be operational.
3-10. Electric Suction Boost Pumps	2	2	1	1	0	**(B, C, D)** If the filter button is popped, system filters must be checked to ensure the system is not contaminated. **(D)** One-time flight to repair base.
3-11. Engine-Driven Hydraulic Pumps	8	8	8	6	6	**(C, D)** The aircraft will not be flown with more than one pump on two nonadjacent engines inoperative. If flown in this configuration, all PTUs shall be operative, and system filters shall be checked to ensure the system is not contaminated. All pumps shall have positive depress capability.
3-12. Flight Engineer Hydraulic Pressure Gauge	4	4	3	3	3	**(B, C, D)** Direct reading gauge shall be operational and periodically monitored.
3-13. Flight Engineer Hydraulic Quantity Indicator	4	4	4	3	3	**(C, D)** Quantity shall be monitored periodically from the sight gauge.
3-14. Hydraulic Boost Press Low Lights	4	4	4	4	4	
3-15. Hydraulic Pressure Gauge (Direct Reading)	4	4	4	3	3	**(C, D)** Flight engineer hydraulic pressure gauge shall be operative.
3-16. Hydraulic Pump Press Low Lights	8	8	6	6	6	**(B, C, D)** May be inoperative, if other pump is depressed for flight and pressure indicator is operational. One light on each of the two non-adjacent engines may be inoperative. May be inop, if corresponding pump is depressed for flight (eng-driven hyd pump exceptions / remarks apply). One may be inop per engine maximum.
3-17. Hydraulic Reservoir Sight Gauge	4	4	0	0	0	**(B, C, D)** May be capped if flight engineer hydraulic quantity indicator is operative.
3-18. Hydraulic Suction Boost Pump	4	4	2	4	2	**(B, D)** #1 and #4 may be inoperative if the respective electrical suction boost pump is operative. Hydraulic filter buttons shall be checked. See 3-10. Remarks.
3-19. Ram Air Turbine (RAT)	1	1	1	1	1	
3-20. RAT Deploy Light	1	1	0	0	0	**(B, C, D)** May be inoperative, monitor RAT unlocked light to indicate RAT is deployed.
3-21. RAT Unlocked Light	1	1	1	1	1	

Table 4.4. Landing Gear.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
4-1 Anti-Skid System						Operation with less than all anti-skid components operative is an emergency procedure and shall be IAW T.O. 1C-5A-1.
a. Anti-Skid Off Light	1	1	1	1	1	**(A, B, C, D)**
b. Brakes Light	1	1	1	1	0	**(D)** Determine status of brakes prior to takeoff. One-time flight to repair base.
c. No Brakes Light	1	1	1	1	1	
d. DET Fail Light	1	1	1	1	1	
e. Brake Pressure Gauge	2	2	2	1	1	**(C, D)** One may be inoperative, if the corresponding flight engineer pressure gauge is operative.
f. Brake Pressure Transmitter	2	2	2	1	1	**(C, D)** One may be inoperative, if the corresponding flight engineer pressure gauge is operative.
g. Brake Supply Selector Switch	1	1	1	1	1	
h. EMER HYD Brake Pressure Light	1	1	1	0	0	**(C, D)** With light inop, emergency brake pressure shall be checked.
i. EMER HYD Brake Pressure Switch	1	1	1	0	0	**(C, D)** With light inop, emergency brake pressure shall be checked.
j. Emergency Brake Accumulator	1	1	1	1	1	
k. Parking Brake	1	1	1	1	0	**(D)** Brake shall be guarded at all times when chocks are removed and scanner shall install chocks in the event of an emergency. Do not accomplish ERO/kneeling with engines running.
4-2. Castering System	1	1	0	0	0	**(B, C, D)** Based on taxi requirements.
a. MLG Free Lights	2	2	0	2	0	**(B, D)** If lights are inop aircrew kneeling operations will not be possible.
b. Aft Landing Gear Position and Emergency Control Switches	2	2	2	2	0	**(D)** Normal caster shall be operational.
4-3. Emergency Extend Switches	5	5	5	5	4	**(D)** If inoperative, an one-time flight with affected gear down may be accomplished to nearest repair facility.
4-4. Kneeling System	1	1	0	0	0	**(B, C, D)** All main landing gear shall be capable of inflight kneeling. If unable to comply, one-time flight with MLG gear down will be accomplished to a repair facility.
4-5. Landing Gear Warning System						
a. Landing Gear Warning Horn	1	1	1	1	1	
b. Landing Gear Warning Light	2	2	2	1	1	**(C, D)** One light shall be operational.

Table continued on next page.

Table 4.4. Landing Gear (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
c. Landing Gear Warning Test Button	1	1	1	1	1	
d. Horn Silence Button	1	1	1	1	1	
e. Emergency Switch On Light	1	1	1	1	1	
f. Bogie Pitch Annunciator Lights	4	4	4	4	3	**(D)** One-time flight to repair base. Do not retract affected gear.
4-6. NLG Fiber Optics Scope	1	1	1	1	0	**(D)** Do not retract the NLG if inop. One-time flight to repair facility.
4-7. NLG Inspection Lights	3	1	1	1	1	**(A, B, C, D)** Light for the fiber optics target required day or night.
4-8. MLG Inspection Lights	2/ gear	1	1	0	0	**(A, B)** One required for night operations.
4-9. Nose Gear Steering System (Normal/Alternate)	1	1	1	1	1	
a. Rudder Pedal Steering	1	1	1	1	0	**(D)** Normal steering shall be operational.
4-10. Position and Indicating Systems	1	1	1	1	0	**(D)** If position indicator panel is inop one-time flight to repair facility required with gear down. Prior to landing affected gear will be visually verified for proper down and locked indications at sequence control panel and inspection covers/fiber optics.
4-11. Relay Logic System	3	3	3	3	0	**(D)** If any relay logic system is inop, the mission may continue with the gear down for one-time flight to nearest repair base.
4-12. MLG Wheel/Tire Assembly	24	24	24	24	24	
4-13. NLG Wheel/Tire Assembly	4	4	4	4	4	
4-14. Crew Entrance Door Accumulator	1	1	1	1	1	
4-15. APU Accumulator (Left/Right)	2	2	2	2	1	**(D)** One-time flight to repair base.

NOTES:

1. Gear-Down Flights:

1.1 Line Missions. During peacetime, gear down flight operations will be limited to those sorties required to move the aircraft to a suitable repair base. Gear down flight should only be considered after all avenues to repair the aircraft have been exhausted. Fly an airspeed that yields the maximum range not to exceed 250 KCAS/M.60. Any malfunction [electrically, hydraulically, or mechanically] that prevents or inhibits the gear from normal retraction will be flown to the nearest repair base with the gear down. The affected gear shall be pinned. In order to prevent loss of the APU servicing door, the panel will be speed taped upon completion of the 1C-5A-1 preflight and prior to flight. Only the door on the appropriate side requires speed tape.

1.2. Local Training Missions. Local missions will not be planned gear down. When inflight malfunctions prohibit gear retraction (except MLG rotational malfunctions), the mission may be continued after the cause of malfunction has been identified and the aircraft commander and maintenance supervisor concur. Do not exceed 200 KCAS/M.60.

1.3. After each gear-down flight, make an AFTO Form 781 entry requiring inspection of the extended gear(s) prior to the next flight to include the associated gear-well areas LN2 servicing panel and doors. Nose landing gear inspections include the kneeling door supporting actuators, brackets, and bulkhead assembly.

Table 4.5. Flight Controls.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
5-1. AILERONS						
a. Aileron Actuator (Hydraulic)	2	2	2	2	2	
b. Aileron Trim Actuators	2	2	2	2	1	**(D)** Mission may be continued with one inoperative as scheduled until reaching a repair capable base. Aileron shall be centered prior to flight.
c. Aileron Trim Position Indicator	1	1	1	1	0	**(D)** Mission may be continued with one inoperative as scheduled until reaching a repair capable base. Aileron shall be centered prior to flight.
d. Aileron Artificial Feel	1	1	1	1	0	**(D)** One-time flight to repair base.
e. Aileron Roll PACS	1	1	1	1	0	**(D)** Mission may continue with system inoperative as scheduled until reaching a repair capable base.
5-2. ALDCS	1	1	0	0	0	**(B, C, D)** Required for launch when air refueling. Refer to T.O. 1C-5A-1, Section V restrictions for inflight failures.
5-3. Go-Around Attitude Subsystem (GAAS)	1	1	1	0	0	**(C, D)** System may be inop until next base with repair capability.
5-4. Autopilot	1	1	0	0	0	**(B, C, D)** Mission requirements dictate. Pitch autopilot required for all flights through RVSM airspace.
5-5. ELEVATORS						
a. Elevator Actuator Inboard (Hydraulic)	2	2	2	2	2	
b. Elevator Actuator Outboard (Hydraulic)	3	3	3	3	3	
c. Elevator Artificial Feel Systems (VFUs)	1	1	1	1	0	**(D)** One-time flight to nearest repair base.
d. Pitch PACS System	1	1	1	1	0	**(D)** Mission may continue inoperative as scheduled until reaching a repair capable base.
5-6. Flap Slat Asymmetry System	1	1	1	1	1	
5-7. Flap Position Indicator	1	1	1	1	0	**(D)** One-time flight to nearest repair base. Slat indicator shall be operational.
5-8. Flight Augmentation Systems						
a. Lateral Augmentation	1	1	1	1	0	**(D)** Refer to T.O. 1C-5A-1, Section II procedures.

Table continued on next page.

Table 4.5. Flight Controls (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
b. Yaw Augmentation	1	1	1	1	0	**(D)** Refer to T.O. 1C-5A-1, Section II procedures. One-time flight to repair base.
c. Pitch Augmentation	1	1	1	1	0	**(D)** Refer to T.O. 1C-5A-1, Section II procedures.
5-9. Flight Spoilers	10	10	10	10	10	
5-10. Ground Spoilers	8	8	8	8	8	
5-11. Horizontal Stabilizer Pitch Trim						
a. Normal Pitch Trim	1	1	1	1	0	**(D)** One-time flight to nearest repair base. Alternate and manual trim shall be available.
b. Alternate Pitch Trim	1	1	1	1	0	**(D)** One-time flight to nearest repair base. Normal and manual trim shall be available.
c. Manual Pitch Trim	1	1	1	1	1	
d. Trim Disconnect Switches	2	2	2	2	1	**(D)** Seat with operative switch shall be occupied at all times. One-time flight to nearest repair base.
e. Horizontal Stabilizer Trim Position Indicator	1	1	1	1	1	
5-12. Ratio Shifters	2	2	2	2	1	**(D)** Other shifter shall be set to the same position.
5-13. Flight Control Hydraulic System Off Lights	54	54	54	27	27	**(B)** One flight spoiler light may be inoperative. **(C, D**) Check the affected system for proper operation prior to flight. A maximum of one inop per flight control.
5-14. Flight Hydraulic Power Shutoff Valves	54	54	54	27	27	**(C, D)** One may be inop per flight control provided the valve is verified open prior to takeoff.
5-15. RUDDERS						
a. Rudder Actuators	4	4	4	4	4	
b. Rudder Limiter	1	1	1	1	0	**(D)** Refer to T.O. 1C-5A-1. Section III.
c. Rudder Trim	1	1	1	1	0	**(D)** Mission may be continued to repair base provided the yaw aug manual trim is operational.
d. Rudder Trim Position Indicator	1	1	1	1	0	**(D)** Mission may be continued with one inoperative as scheduled until reaching a repair base. Rudder shall be centered prior to flight.
e. Emergency Rudder Trim	1	1	1	1	0	**(D)** See T.O. 1C-5A-1, Sections III & V.
5-16. Slat position Indicator	1	1	1	1	0	**(D)** One-time flight to repair base. Flap indicator shall be operational.
5-17. Slat Drive Disconnect Switch	1	1	1	1	1	

Table continued on next page.

Table 4.6. Fuel Systems.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
6-1. Air Refuel System.	1	1	1	1	1	**(B, C, D)** Not required on missions not conducting air refueling.
6-2. Aerial Refuel Slipway Lights	2	2	2	1	1	**(B, C, D)** Not required for daylight training or missions not conducting air refueling.
6-3. Main Tank Boost Pumps	2/ Tank	2	2	2	1	**(D)** Crossfeed and isolation valves shall be operational.
6-4. Auxiliary Tank Boost Pumps	2/ Tank	2	1	1	0	**(B, C)** One pump per tank may be inoperative. **(D)** Both pumps may be inop in each tank if the tank is not serviced with fuel and/or refuel valve is not leaking fuel back into the associated tank.
6-5. Extended Range Tank Boost Pumps	2/ Tank	2	0	2	0	**(C)** One pump per tank may be inoperative. **(B, D)** Both pumps may be inop in each tank if the tank is not serviced with fuel and/or refuel valve is not leaking fuel back into the associated tank.
6-6. Main Fuel Boost Pump Out Lights	4	4	4	4	3	**(D)** One-time flight to nearest repair base.
6-7. Engine Fuel Boost Pump Pressure Low Lights	4	4	4	4	3	**(D)** One-time flight to nearest repair base.
6-8. Fuel Jettison Valve	2	2	2	2	1	**(D)** Valve may be inop (failed closed) if all separation valves are operational.
6-9. Fuel Temperature Selector	1	1	1	1	1	
6-10. Fuel Temp Indicator	1	1	1	1	1	
6-11. Main Tank Fill Valves	4	4	4	4	3	**(D)** One-time flight to nearest repair base.
6-12. Aux Tank Refuel Valves	4	4	0	0	0	**(B, C, D)** Refuel valve may be failed (closed only) if the tank is not needed for fuel.
6-13. Extended Range Tank Refuel Valve	4	4	0	0	0	**(B, C, D)** Refuel valve may be failed (closed only) if the tank is not needed for fuel.
6-14. Isolation Valves	4	4	4	4	3	**(D)** May be failed (closed only) if not needed for other fuel transfer methods. Respective crossfeed valve shall be operational.
6-15. Separation Valves	3	3	2	2	2	**(B, C, D)** Center separation valve may be failed closed if both aerial refuel isolation valves are operative. Outboard separation valves may be failed closed if the respective iso and crossfeed valves are operative.
6-16. Crossfeed Valves	2	2	2	2	1	**(B, C, D)** May be failed (closed only), to next repair base, if not needed for other fuel transfer methods. Respective isolation valves shall be operational.
6-17. Ground Refuel Isolation Valves	2	2	1	1	1	**(B, C)** Center separation valve shall be operational. **(D)** If center separation valve is failed closed both AR Iso valves must be operational.

Table continued on next page.

Table 4.6. Fuel Systems (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
6-18. Manifold Press Low Lights	4	4	2	2	2	**(B, C, D)** Inboard lights may be inop provided pressure gauge is operative.
6-19. Fuel Manifold Pressure Indicator	2	2	1	1	1	**(B, C, D)** Both shall be operable for aerial refueling missions. Seperation valves and manifold press low lights shall be operational.
6-20. Sump Low Warning	2	2	2	2	1	**(D)** The restriction of T.O. 1C-5A-1, Section III, applies.
6-21. Main Tank Low Light	2	2	2	2	2	
6-22. Vent Fill Light	2	2	2	2	1	**(D)** One time flight to nearest faclity. Monitor Fire Suppression Panel for Isolation Valve Closed lights.

NOTES:

1. Fuel System Failures. The following policy does not relieve operations or maintenance personnel from compliance with the procedures in T.O. 1C-5A-1 and T.O. 1C-5A-2-5:

1.1. Inoperative Fuel Quantity Indicators. The aircraft will not be flown with more than one inoperative fuel quantity indicator for each wing (symmetrically opposite indicator in the other wing shall be operative).

1.1.1. Aircraft scheduled for air refueling missions should have all needed fuel quantity indicating systems operative for inflight refueling. In no case will more than one required fuel quantity indicator be inoperative.

1.2. Air refueling procedures with an inoperative fuel quantity indicator:

1.2.1. Except in an emergency, air refueling will not be attempted with more than one fuel quantity indicator for each wing or symmetrically opposite quantity indicators inoperative. If fuel is not required in a tank with an inoperative indicator, the tank will be checked to ensure it is empty prior to flight.

1.2.2. A tank that is used with an inoperative indicator will be serviced internally with a known quantity of fuel from another tank. This will not be accomplished between the precontact position with the tanker and termination of refueling with that tanker.

1.2.3. If the total main tank fuel quantity is less than 30,000 pounds and a main tank quantity indicator is inoperative, simultaneous tanker refueling of all main tanks is authorized. Fill these tanks prior to commencing auxiliary or extended range tank servicing. Immediately after main tank servicing, a tanker report of fuel transferred will be used to verify the quantity of fuel in the tank with the inoperative indicator. Position the AUTO REF switch to MAN for transfer. If a trim imbalance condition is suspected (trim or heavy wing), terminate tanker transfer and obtain the quantity of fuel offloaded prior to reinitiating transfer. Further servicing of a tank with an inoperative indicator can be made, using known quantities from internal sources.

1.3. Local Missions (including AR local missions). For local/AR local missions planned with inoperative fuel quantity indicators:

1.3.1. Do not fly with <u>any</u> main tank fuel quantity indicators inoperative.

1.3.2. All auxiliary and extended range tanks containing fuel or needed for air refueling will have operative fuel quantity indicators. If fuel is not required in a tank with an inoperative indicator, the tank will be checked to ensure that it is empty prior to flight.

1.3.3. Safety the fuel tank according to T.O. 1C-5A-2-5.

Table 4.7. Electrics.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
7-1. AC Load Meters	5	5	3	3	3	**(B, C, D)** Shall be operational for each operating generator.
7-2. AC Volt Meter	1	1	1	1	1	
7-3. AC Volt & Frequency Selector Switch	1	1	1	1	1	
7-4. Battery	2	2	2	2	1	**(D)** Inoperative battery must be disconnected.
7-5. Battery Light	1	1	1	1	0	**(D)** One-time flight to nearest repair base.
7-6. Battery Switch	1	1	1	1	0	**(D)** Shall be able to select operable battery and turn off battery.
7-7. Bus Ties	4	4	3	4	3	**(B, D)** One BTC may be inop provided the associated bus and generator is operational. **(D)** One-time flight to repair base.
7-8. Bus Ties Open Lights	4	4	4	4	4	
7-9. Constant Speed Drive (CSD)	4	4	3	3	3	**(B, C, D)** One may be inoperative and disconnected, provided the bus tie system is operative. The oil level of the disconnected CSD will be checked for proper oil quantity prior to flight and during all subsequent en route stops. Do not fly more than 50 hours with a disconnected CSD (nonwaiverable).
7-10. CSD Fail Warning	4	4	3	3	3	**(B, C, D)** Shall be operative for each operative generator/CSD.
7-11. CSD Temperature Gauge	4	4	3	3	3	**(B, C, D)** Should be operative for each operative generator/CSD. May be inop if CSD Fail light is operational.
7-12. DC Load Meter	2	2	2	2	2	
7-13. DC Volt Meter	1	1	1	1	0	**(D)** One-time flight to repair facility.
7-14. DC Volt Meter Selector Switch	1	1	1	1	0	**(D)** One-time flight to repair facility.
7-15. Emergency Bus Power Relay	1	1	1	1	1	
7-16. Emergency Generator	1	1	1	1	1	
7-17. Engine Driven Generator	4	4	3	3	3	**(B, C, D)** One may be inoperative provided the bus tie system is operative. For Space Cargo Modification (SCM) airplanes on Shuttle Container Transport System (SCTS) missions, all 4 generators will be operational.
7-18. Frequency Meter	1	1	1	1	1	
7-19. Generator Fail Lights (Engines)	4	4	3	3	3	**(B, C, D)** Shall be operative for each operating generator.
7-20. Generator Fail Lights (APU)	2	2	1	1	1	**(B, C, D)** Should be operative for each operative APU.
7-21. Generator Out Lights (Engine)	4	4	3	3	3	**(B, C, D)** Shall be operative for each operating generator.

Table continued on next page.

Table 4.7. Electrics (Continued)

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
7-22. Generator Out Lights (APU)	2	2	1	1	1	**(B, C, D)** May be inoperative if generator is not used. (See APU for limitations.)
7-23. Generator Load Controller	4	4	3	3	3	**(B, C, D)** Should be operative for each operating generator.
7-24. Isolated Bus Switch	1	1	1	1	1	
7-25. 325 Amp Current Limiter	1	1	1	1	1	
7-26. 400 Amp Current Limiter	1	1	1	1	0	**(D)** Both transformer rectifiers shall be operational for a one-time flight to a repair base.
7-27. Phase Selector Switch	1	1	1	1	1	
7-28. Transformer Rectifiers	2	2	2	2	1	**(D)** 400 amp current limiter shall be operative. One-time flight to repair base.
7-29. Aircraft Lighting						***see AFI 11-202V3 requirements***

Table 4.8. Instruments.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
8-1. Flight Director System (FDS)	2	2	2	2	1	**(D)** Two required for Cat II ILS approaches
8-2. Navigation Selector Panel (NSP)	2	2	2	2	2	
8-3. Auxiliary Navigation Selector Panel (ANSP)	2	0	0	0	0	
8-4. Pilots' Bearing Distance Heading Indicator (BDHI) Systems	2	2	2	2	0	**(D)** Available approaches dictate requirement.
8-5. Navigator's Bearing Distance Heading Indicator (BDHI) System	2	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-6. Navigator's Selector Panel	1	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-7. Horizontal Situation Indicator (HSI)	2	2	2	2	1	**(D)** Pilot with inoperative HSI will have an operable BDHI.
8-8. Remote HSI Heading and Course Selector Panels	2	2	0	0	0	**(B, C, D)** Normal HSI heading and course selectors must be operable.
8-9. Attitude Director Indicator (ADI)	2	2	2	2	2	
8-10. Rate of Turn Sensor	2	2	2	2	0	**(D)** One must be operational for flight in IMC conditions.

Table continued on next page.

Table 4.8. Instruments (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
8-11. Central Air Data Computer (CADC)	2	2	2	2	2	**(A, B, C, D)** CADC Replacement. These procedures apply when one CADC system has not been disturbed. If computer failure, as opposed to a pitot static system failure, is confirmed and a new CADC is installed, a leak check is not required. Cross-check pilot and copilot airspeed indicators at 80 knots on takeoff roll. Abort the takeoff if airspeed differs by five knots or more. **Note**: Leak check is required before flights through RVSM airspace. **(A, B, C, D)** Both computers required for flights through RVSM airspace.
8-12. Nav's Altimeter	1	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-13. Nav's Vertical Velocity Indicator (VVI)	1	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-14. Navigator's Airspeed Indicator	1	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-15. Total Air Temperature (TAT) Indicator	1	1	1	1	0	
8-16. Magnetic Compass	1	1	1	1	1	
8-17. Clocks	4	0	0	0	0	**(A, B, C, D)** Required at flight engineer's station if no other time device is available.
8-18. Accelerometer	1	1	1	1	1	
8-19. Nav's TAS Indicator	1	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-20. Nav's TAS Indicator Selector Switch	1	0	0	0	0	**(A, B, C, D)** Required for airdrop and SOLL II missions.
8-21. Vertical Scale Flight Instruments (VSFI)						
a. AOA Indicator	2	2	0	1	0	**(C)** Used to validate aircraft performance.
b. Mach Indicator	2	2	0	2	0	**(B, D)** Use corresponding calibrated airspeed to maintain desired Mach, if required.
c. Airspeed Indicator	2	2	2	2	2	
d. Vertical Velocity Indicator (VVI)	2	2	2	2	2	
e. Altimeter	2	2	2	2	2	**(A, B, C, D)** Both required for flights through RVSM airspace.

NOTES:

Aircraft attitude, vertical velocity indications, altitude, speed, and heading instruments should be operative in both pilot positions. Engine performance instruments should be operative in both the pilot's and engineer's positions. For instruments with both analog and digital displays, as a minimum the analog must be operational. ***EXCEPTION:*** The radar altimeter may have either analog or digital display operational.

Do not accept aircraft from factories, modification centers, or depots unless all instruments are installed and operative.

Table 4.9. Avionics.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
9-1. VHF Command Radio	2	2	1	1	1	**(B, C, D)** Shall be installed in the #1 position.
9-2. UHF Command Radio	2	2	1	1	1	**(B, C, D)** Shall be installed in the #1 position.
9-3. L-Band SATCOM	1	1	0	0	0	**(C, D)** System may be operational unless approved by AMC TACC.
a. L-Band SATCOM Laptop Computer	1	1	0	0	0	**(C, D)** If the laptop becomes unusable, the mission may continue until reaching home station. **(C, D)** The AMC TACC must be notified of the inability to provide SATCOM information.
9-4. VHF Nav Radios	2	2	2	2	1	**(D)** Shall be installed in the #1 position.
9-5. HF Communication Radio	2	2	1	2	1	**(B, D)** One shall be operational when out of VHF and UHF range.
9-6. ADF	1	1	0	0	0	**(C, D)** Required if necessary for mission accomplishment
9-7. TACAN	2	2	1	1	1	**(B, C, D)** Shall be installed in the #1 position.
9-8. Marker Beacon	1	1	0	0	0	**(B, C, D)** Available approaches dictate requirement.
9-9. Inertial Navigation Systems (INS)	3	3	2	2	2	**(B)** One INS may be inoperative for flight (navigation and attitude). If the attitude function is inoperative, flight should be planned only in VMC. If the failure occurs in flight, training may be continued in either VMC or IMC. Attitude function will be operational for all air refueling missions. **(C, D)** One INS may be inoperative for navigation, provided the attitude function is operative. The fully operational units should be installed in the number 1 and 3 positions.
a. FSAS/INS Control/ Display Unit (CDU)	1	1	0	0	0	**(B, C, D)** If FSAS/INS CDU is not available, an INS CDU will be installed. **(B, C, D)** Required for all flights through RVSM airspace and aircraft modified by T.O. 1C-5-629.
b. Display Interface Control Unit (DICU)	1	1	0	1	0	**(B, D)** Required if weather radar is required for flight. **(A, B, C, D)** Required for all flights through RVSM airspace.

Table continued on next page.

Table 4.9. Avionics (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
9.10. Standby Attitude Indicator/Air Data Unit (modified by T.O. 1C-5-635)						
a. Standby Attitude Indicator	1	1	0	0	0	**(B, C, D)** See 9-11a Remarks/Limitations.
b. Air Data Unit	1	0	0	0	0	
9-11. Flight Management System (FMS) (T.O. 1C-5-606)						
a. Control Display Unit (CDU)	3	3	2	2	2	**(B, C, D)** Operational units should be installed in the #1 and #3 positions. INU associated with the inoperative CDU will not be operational. Standby attitude indicator must be operational.
b. Bus-Subsystem Interface Unit (BSIU)	3	3	3	3	3	
c. Data Loader	1	1	0	0	0	**(B, C, D)** Required for GPS approaches.
d. GPS Key Fill Panel	2	2	0	0	0	
e. FMS / INS Status Panel	2	2	1	1	1	**(B, C, D)** Two required for GPS approaches.
f. FMS Auxiliary Control Panel	1	1	1	1	1	
g. FMS Master Power Control Panel	1	1	1	1	1	
h. Comm/Nav Radio Volume Control Panel	1	1	1	1	1	
i. GPS Receiver Processor Unit (RPU)	3	3	1	1	0	**(B, C)** CDU with operational RPU must be installed in the pilot position. If a second is installed, it should be placed in the co-pilot position. Select the working GPS for the integrated nav solution. **(D)** If all three RPUs are inoperative all CDUs must be functional to place INUs in triple mix.
j. GPS Antenna	2	2	1	1	0	**(B, C)** Select the working GPS for the integrated nav solution. **(D)** If both antennae are inoperative all CDUs must be functional to place INUs in triple mix.
k. GPS Antenna Electronics Unit (AEU)	2	2	1	1	0	**(B, C)** Select the working GPS for the integrated nav solution. **(D)** If both AEUs are inoperative all CDUs must be functional to place INUs in triple mix.
9-12. Combined Altitude Radar Altimeter System (CARA)	2	2	1	1	1	**(B, C)** Pilot's position will be operational. **(B, C, D)** Both required for Cat II ILS approaches.
9-13. Hand Held Global Positioning System (HHGPS)	1	1	1	1	1	**(A, B, C, D)** Not required on aircraft modified by T.O. 1C-5A-606
9-14. Radar	1	1	0	1	0	**(B, D)** Shall be operational for all flights into areas of known or forecast thunderstorms.
9-15. CADC Select Switch	1	1	0	0	0	**(A, B, C, D)** Required for flight in RVSM airspace.

Table 4.9. Avionics (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
9-16. IFF	1	1	1	1	1	
a. Mode 4 Computer	1	1	0	0	0	**(A, B, C, D)** Do not delay takeoff except when the aircraft will transit an area where safe passage procedures are implemented. Enroute failure, aircraft will continue to their intended destination(s). Where safe passage is implemented, follow procedures for inoperable Mode 4.
9-17. Interphone System						Shall be able to communicate with all occupied positions.
a. Cockpit Loudspeaker	3	3	2	1	0	
b. Microphone Switches (Yoke)	2	2	2	2	2	
c. Microphone Switches (Floor)	2	2	1	1	0	**(B, C)** Should be operational at engineer's position. May be inop at navigator's position except for SOLL II and airdrop.
9-18. Public Address (PA) System	1	1	1	1	0	**(D)** If inoperative in troop compartment, interphone communications shall be maintained.
a. Troop Compartment Public Address (PA)	1	[1]	0	0	0	**(B, C, D)** Must be operative when carrying passengers unless other means of communication is available (i.e., bullhorn).
9-19. Avionics Equipment Cooling System						
a. Avionics Cooling Fans	2	2	2	1	1	**(C, D)** One fan may be inoperative provided no physical damage exists that would prevent the other fan from cooling the compartment.
b. Cooling Fan Fail Light	2	2	2	1	1	
c. COMPT OVHT Light	1	1	1	1	1	
d. Cooling Effects Detector	1	1	1	1	1	
f. Panel Fan Fail Light	1	1	1	1	0	

Table 4.10. Recording and Emergency Location

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
10-1. Emergency Locator Transmitter (ELT)	1	1	1	1	1	
10-2. Flight Incident Recorder (FIR)	1	1	1	1	1	
10-3. Cockpit Voice Recorder	1	1	1	1	1	

Table 4.11. MADAR.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
11-1. Signal Acquisition Remotes (SAR)						
SAR 01	1	1	1	0	0	FIR Inputs.
SAR 03	1	1	1	0	0	FIR Inputs.
SAR 04	1	1	1	0	0	FIR Inputs and required for engine vibration.
SAR 05	1	1	1	0	0	FIR Inputs.
SAR 13	1	1	1	0	0	FIR Input.
SAR 14	1	1	1	0	0	FIR Input.
SAR 17	1	1	1	0	0	FIR Input.
SAR 18	1	1	1	0	0	FIR Input.
SAR 19	1	1	1	0	0	FIR Inputs and required for engine vibration.
SAR 20	1	1	1	0	0	FIR Inputs and required for engine vibration.
SAR 21	1	1	1	0	0	FIR Inputs and required for engine vibration.
SAR 22	1	1	1	0	0	FIR Inputs and required for engine vibration.
SAR 27	1	1	1	0	0	**(C, D)** FIR Inputs. Mission may continue to next repair facility.
SAR 28	1	1	1	0	0	**(C, D)** FIR Inputs. Mission may continue to next repair facility.
SAR 29	1	1	1	0	0	**(C, D)** FIR Inputs. Mission may continue to next repair facility.
11-2. MADAR						
a. Controller (CNTRL)	1	1	1	0	0	**(C, D)** Continue to next repair facility.
b. Display Unit (DU)	1	1	1	0	0	**(C, D)** POU must be operational.
c. Printout Unit (POU)	1	1	1	0	0	**(C, D)** DU must be operational.
d. Maintenance Data Recorder (MDR)	1	1	1	0	0	**(C, D)** Continue mission to next repair facility.
e. Multiplexer/Processor (MUX/PROC)	1	1	1	1	1	Required for FIR Inputs.
f. Power Supply (P/S)	1	1	1	1	1	Required for FIR Inputs.
g. Signal Conditioner /Multiplex. (SCM)	1	1	1	1	1	Required for FIR Inputs.

NOTES:

1. Indicated engine vibration reported by MADAR:

1.1. One SAR/channel indicating fan (N1) or core (N2) vibration out of limits and one SAR/channel indicating normal vibration levels suggests an indicating system malfunction if they differ by more than .5 scope divisions. For this condition, the engine vibration will be considered within limits.

1.2. Both EVI channels indicating fan (N1) vibration out of limits will require fan balance confirmation of engine condition by ground test equipment.

1.3. Both EVI channels indicating core (N2) vibration out of limits will require confirmation of engine condition by ground test equipment.

1.4. One EVI channel indicating fan (N1) or core (N2) vibration out of limits and the other channel inoperative will require confirmation of engine condition by ground test equipment.

Table 4.12. Door (Troop & Cargo).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
12-1. Visor and Forward Ramp	1	1	1	1	1	**(A, B, C, D)** Aircraft shall not depart with inoperative or missing locks on the visor, forward ramp. **(A)** Aircraft shall not be flown from home station when manual override is required to open, close, or lock the visor or forward ramp assembly. **(C, D)** Aircraft may depart en route stations when hydraulic manual override is required to operate the door system. **(B)** Door locks may be inoperative if it can be determined all locks are positively locked.
12-2. Forward Ramp Manual Locking Pins	8	8	8	8	8	
a. Yellow Streamer	8	8	8	0	0	**(C, D)** Locking pin with missing streamer will be annotated in the AFTO Form 781.
b. Mechanical Lock Indicators	10	10	0	0	0	**(B, C, D)** Maintenance will repair mechanical lock indicator discrepancies within the allotted ground times if maintenance skill and spare parts are available. **(B, C)** Missions may be continued if repair is not possible and the lock indicator light is functioning normally and it can be positively determined that the locks are locked. **(D)** Missions may be continued if repair is not possible and it can be positively determined that the locks are locked.
12-3. Visor Door Mechanical Lock Indicators	23	23	0	0	0	**(B, C, D)** Maintenance will repair visor door mechanical lock indicator discrepancies within the allotted ground times if maintenance skill and spare parts are available. Missions may be continued if repair is not possible and the lock indicator light is functioning normally and it can be positively determined that the locks are locked.

Table 4.12. Door (Troop & Cargo).(Continued)

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
12-4. Ramp Extension Support Jacks	4	4	0	0	0	**(B, C, D)** Refer to T.O. 1C-5A-9 for loading limitations when less than four jacks are serviceable.
12-5. Aft Cargo Doors and Ramp	1	1	1	1	1	**(A, B, C, D)** Aircraft shall not depart with inoperative or missing locks on the aft ramp, pressure, side or center doors. **(A)** Aircraft shall not depart home station when aft side cargo door sag interrupts normal electrical operation of the doors. **(B)** Door locks may be inoperative if it can be determined that the lock is positively locked. For AR local missions with cargo on board, all aft door locks will be fully operative to permit cargo jettison. **(A, C)** Aircraft shall not be flown when manual override is required to open, close, or lock the side, center, pressure doors, or aft ramp assembly. **(C, D)** If no cargo is to be carried until arriving at another suitable repair facility, mission may continue with inop doors or ramp. **(D)** Aircraft may depart stations where repair capability is not available and hydraulic manual override is required to operate the door system. (See **AFI 11-2C-5V3-CL-3/4**) for procedures to close and lock the center door and ramp during airdrop operations.)
12-6. Aft Ramp Manual Locking Pins	14	14	14	14	14	
a. Yellow Streamer	14	14	14	0	0	**(C, D)** Locking pin with missing streamer will be annotated in the AFTO Form 781.
b. Mechanical Lock Indicators	14	14	0	0	0	**(B, C, D)** Maintenance will repair mechanical lock indicator discrepancies within the allotted ground times if maintenance skill and spare parts are available. **(B, C)** Missions may be continued if repair is not possible and the lock indicator light is functioning normally and it can be positively determined that the locks are locked. **(D)** Missions may be continued if repair is not possible and it can be positively determined that the locks are locked.

Table 4.13. Oxygen.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
13-1. 25 Liter Converter	1	1	0	1	0	**(B, D)** 25 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the proposed mission.
13-2. 75 Liter Converter	1	1	0	1	0	**(B, D)** 75 liter converter may be inoperative provided the other converter is serviced with an adequate quantity for the proposed mission.
13-3. Oxygen Shut-off Valve	1	1	1	1	1	
13-4. Recharging Hoses	10	10	10	10	10	
13-5. Flight Crew Oxygen Regulator	5	5	5	5	3	**(D)** The pilot, copilot and engineer positions must be operational. Mission may continue to a repair facility.
13-6. Relief bunk oxygen system	6	6	0	4	4	**(B, C, D)** Bunk will not be occupied above FL 250 with inop regulator.
13-7. Continuous Flow Oxygen Regulator	2	2	2	2	2	**(A, B, C, D)** Both must be operational.
13-8. Drop-Down Masks	101	101	0	0	0	**(B, C, D)** One required for every passenger in each compartment.
13-9. Oxygen Quantity Indicator (25 liter)	1	1	0	1	0	**(B, D)** 75 liter indicator shall be operational.
13-10. Oxygen Quantity Indicator (75 liter)	1	1	0	1	0	**(B, D)** 25 liter indicator shall be operational.
13-11. Quantity Low Lights	2	1	0	1	0	**(A, B, C, D)** Corresponding gauge shall be operational.
13-12. Oxygen Quantity Indicator (25 liter) Test Switch	1	1	0	1	0	**(A, B, C, D)** Corresponding gauge shall be operational.
13-13. Oxygen Quantity Indicator (75 liter) Test Switch	1	1	0	1	0	**(A, B, C, D)** Corresponding gauge shall be operational.
13-14. Oxygen Warning System	1	1	1	1	0	**(D)** If passengers are on board, and the Oxygen warning system is inoperative, the flight is limited to 10,000 ft MSL. The crew will be on oxygen if the flight is above 10,000 ft MSL.
13-15. Portable Oxygen Bottles	16	16	12	12	12	**(B, C, D)** If any troop compartment bottle is missing, the compartment shall be unoccupied. Any crewmember entering the troop compartment in flight, must have a supplemental oxygen bottle if all troop compartment oxygen bottles are missing.

Table continued on next page

Table 4.14. Warning Systems.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
14-1. Stallimiter System	2	2	1	1	1	**(B, C, D)** One fully functioning system required for all departures.
14-2. Ground Proximity Warning System (GPWS)	1	1	1	1	1	**(A, B, C, D)** If the GPWS is inoperative due to a bad pilot's radar altimeter, the copilot's radar altimeter shall be swapped to the pilot's position. Waivers will be considered only for certain troop movements.
14-3. Wind Shear and Altitude Alert Warning	1	1	1	0	0	**(C, D)** Requires operable FSAS. If the wind shear warning function is inoperative, the flight engineer shall pass a reference ground speed with the Before Landing Checklist and update IAW with T.O. 1C-5A-1. **(A, C, D)** Altitude alerting required for all flights through RVSM airspace and airplanes modified by T.O. 1C-5-629.
14-4. Master Caution System	1	1	1	1	1	**(A, B, C, D)** System shall be able to be reset. The aircraft may be flown with an annunciator light that will not reset as long as the master caution resets. Both pilot's and engineer's caution panels should be operational.
a. Master Caution Lights	2	2	2	1	1	
b. Master Auto Lights	2	2	2	1	1	
14-5. Door Warning System						
a. Visor	25	25	25	25	25	**(A ,B, C, D)** All warning lights (Nt Locked) shall be operative.
b. Forward Ramp	2	2	2	2	0	**(D)** The forward ramp lock indicator lights can be inoperative for flight from en route stations when repair capability is not available, provided the mechanical pins are installed and the locks are verified to be locked.
c. Crew Entrance Door	1	1	1	1	1	
d. Aft Ramp	2	2	2	2	0	**(D)** The aft ramp lock indicator lights may be inoperative for flights from en route stations where en route repair capability is not available provided the mechanical pins are installed and the locks are verified to be locked.
e. Fwd Underfloor Access Door	1	1	0	0	0	**(B, C, D)** Light may be inoperative provided the door is verified to be closed and locked.
f. Aft Winch Access Hatch	1	1	0	0	0	**(B, C, D)** Light may be inoperative provided the door is verified to be closed and locked.
g. Aft Bilge Access Hatch	1	1	0	0	0	**(B, C, D)** Light may be inoperative provided the door is verified to be closed and locked.
h. Forward Bilge Access Hatch	1	1	0	0	0	**(B, C, D)** Light may be inoperative provided the door is verified to be closed and locked.

Table continued on next page

Table 4.14. Warning Systems (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
i. Left and Right Side Cargo Doors	4	4	4	0	0	**(C, D)** Lights may be inoperative provided the door(s) are verified to be locked and the center door is closed and locked.
j. Center Cargo Door	2	2	2	2	2	
k. Ramp to Pressure Door Locks	4	4	4	4	2	**(D)** Outboard not locked lights may be inoperative.
14-6. Smoke Detector System	1	1	1	1	0	**(D)** If any component is inoperative associated compartment shall be scanned every hour. FE 1301 detection system shall be fully operational. If troop compartment detector is inop that compartment should be occupied. An individual smoke detector unit may be inoperative provided the area is occupied or scanned every hour during flight
14-7. Bailout Alarm	1	1	1	1	0	**(D)** May be inoperative for flight provided the public address (PA) is operative or the PA may inoperative and direct communication is maintained between all occupied compartments.
14-8. Defensive System	1	1	0	0	0	**(A, B, C, D)** Airplanes modified by T.O. 1C-5-632. Shall be operative for missions that require protection from surface or air threats.

Table 4.15. Fire Suppression System (FSS).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
15-1. DEWARS	2	2	1	1	1	**(B, C, D)** Flight is permitted with one unserviceable DEWAR provided the system functions remain operative.
15-2. Engineers control panel	1	1	1	1	1	
15-3. Nose control panel	1	1	1	1	0	**(D)** One-time flight to repair facility.
15-4. Optical Detection	1	1	1	1	0	**(D)** If any component is inoperative, associated compartment shall be scanned every hour. Smoke detection system shall be fully operational. One-time flight to nearest repair facility.
15-5. Isolation Valve	2	2	1	1	1	**(B, C, D)** Isolation valve shall be operational for serviced DEWAR.
15-6. Outboard Main Tank Delta P Switch	2	2	2	2	0	**(D)** Wings will not be pressurized.
15-7. Overboard Relief Valves	2	2	1	1	1	**(B, C, D)** Not required with unserviced DEWAR.
15-8. Pressure Limiters	2	2	1	1	1	**(B, C, D)** Not required with unserviced DEWAR.
15-9. Primary Climb/Dive Valve	2	2	0	0	0	**(B, C, D)** Secondary climb/dive valve must be operational. Manual override must be operational.

Table continued on next page

Table 4.15. Fire Suppression System (FSS) (Cont.).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
15-10. Primary Regulators	2	2	1	1	1	**(B, C, D)** Not required with unserviced DEWAR.
15-11. Secondary Climb/Dive Valve	2	2	0	0	0	**(B, C, D)** Primary climb/dive valve must be operational. Manual override shall be operative.
15-12. Secondary Pressure Regulators	2	2	1	1	1	**(B, C, D)** Required for applicable DEWAR.
15-13. Vent Box Float Switch	2	2	2	2	2	
15-14. Wing Pressure Warning System	2	2	2	2	2	
15-15. Liquid Nitrogen Service Panel	1	1	1	1	1	**(A, B, C, D)** All functions operational.
15-16. Central Processing Unit (CPU)	1	1	1	1	1	
15-17. FSS Fire Detection	1	1	1	1	1	

NOTES:

1. LN2 Servicing. Because of the increased safety margin provided by all functions of the FSS, aircrews should obtain full LN2 servicing at stations with servicing capability.

1.1. Minimum servicing requirements:

1.1.1. Home Station Departures. The airplane will be fully serviced (650 pounds per DEWAR minimum to allow for gauge inaccuracies, automatic shutoff settings, and LN2 boil-off).

1.1.2. En route Stations With Servicing Capability. Depart en route stations with enough LN2 (plus fire fighting reserve) to last to the next station with servicing capability.

1.1.2.1. Do not delay mission progress if unable to obtain LN2 servicing due to temporary outages or servicing equipment problems.

1.1.3. En route Stations Without Servicing Capability. The mission may be continued regardless of the amount of LN2 on board. If the remaining LN2 will be depleted prior to the next en route stop, consider venting the wing in order to retain a fire fighting reserve. If this option is utilized, do not vent the wing until just prior to descending into the next en route stop and make an information entry in AFTO Form 781.

1.1.4. Local Missions. Not less than that required for the planned mission duration (plus an adequate fire fighting reserve). For ERCCs, airplanes will be fully serviced for the first half to ensure the second half will have adequate LN2.

1.2. Basic Requirments:

1.2.1. Flight is not permitted with system LN2 (liquid nitrogen) leaks in excess of 50 pounds per DEWAR per 12 hours.

1.2.2. Allow 1 hour after servicing for system stabilization prior to start of leak check.

1.2.3. The following values may be used to calculate the minimum amount of LN2 required by paragraphs 1.2 and 1.4, above. These values are guides; the amount used in some airplanes may vary. Document significant variations in AFTO Form 781.

1.2.3.1. Twelve pounds for every 1,000-feet of descent planned during a line or AR mission. EXAMPLE: A line AR mission that requires an 8,000-foot descent from initial level off altitude to rendezvous altitude, followed by a final cruise altitude of FL370 will need 540 pounds of LN2. (8,000 + 37,000 = 45,000-feet of total descent x 12 = 540 pounds.)

1.2.3.2. One hundred twenty pounds will be used for each hour of local transition flying.

1.2.3.3. Two hundred fifty (250) pounds for a fire fighting reserve (adequate for one application to the largest zone).

Table 4.16. Emergency Equipment.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
16-1. Life Rafts/Survival kits	4	4	2	2	2	**(B, C, D)** Troop compartment rafts may be inoperative/missing; however, total troop passengers will be reduced by 25 per inoperative raft. A raft shall be installed at the #2 escape hatch.
16-2. Descent Reels	24	24	*	*	*	***(B, C, D)** Minimum required is one for each crewmember/passenger on the flight deck.
16-3. Escape Slides	5	5	2	2	2	**(B, C, D)** Limit troop compartment to 40 passengers/crew when any exit or slide is inoperative. An exit/slide shall be operative on each side of the troop compartment when passengers are carried. **(B, C, D)** An escape slide shall be installed at the #5 service door.
16-4. Escape Ropes	8	8	5	5	5	**(B, C, D)** Three escape ropes shall be installed in the cargo compartment, one above the troop compartment ladder, and one at each exit in the troop compartment that has an operational liferaft or escape slide installed. Troop compartment exits are not considered operational unless an escape rope is installed.
16-5. First Aid Kits	22	22	7	7	7	**(B, C, D)** The minimum number required when troop compartment is unoccupied is 5 on the flight deck and 2 in the cargo compartment. Full number required when carrying troops/passengers.
16.6. Fire Extinguisher						
a. “B” model aircraft	17	17	17	17	9	**(D)** A minimum of 3 fire extinguishers shall be available in each compartment
b. “A” model aircraft	15	15	15	15	9	**(D)** A minimum of 3 fire extinguishers shall be available in each compartment
16.7 Life Vests	95	95	0	0	0	**(B, C, D)** One required for each occupant during over water flights.
16-8. Crash Axes	3	3	3	2	2	**(C, D)** A minimum of one crash ax shall be available on the flight deck and one available in the troop.
16-9. Cargo Compartment Escape Slides	2	0	0	0	0	**(A, B, C, D**) Required only for the Air Bus configuration.
16-10. Emergency Exit Lights	12	12	12	12	12	**(A, B, C, D)** Shall be operational in all occupied compartments and for night missions. A single emergency exit light is easily repaired by replacing (2) 327 bulbs if not charging.

Table continued on next page

Table 4.16. Emergency Equipment (Continued).

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
16-11. Rope Ladder	1	1	1	0	0	**(C, D)** Not required if emergency escape slide or emergency descent reels are operational.
16-12. Rope Ladder Release Handles	2	2	2	0	0	**(C, D)** Shall be operational when rope ladder is installed.
16-13. FE 1301	20	0	0	0	0	**(A, B, C, D)** Bottles may be non-operational as long as detection system is operational. Two additional 1-gallon fire extinguishers shall be placed in cargo compartment.

Table 4.17. Miscellaneous Equipment.

Item/System	Installed	Required				
		A	B	C	D	Remarks/Limitations/Exceptions
17-1. Lock Blocks, Pressure Door Hinge	2	2	2	0	0	
a. F-valve Safety Guard	1	1	1	0	0	
17-2. Night Curtain	2	2	0	0	0	**(A, B, C, D)** Required for SOLL II night operations only. **(A)** Missing curtains are at the crew's discretion.
17-3. Scroll Checklist Holders	4	4	2	0	0	**(B)** Copilot and flight engineer positions required.
17-4. Service Door Safety Gates	2	2	0	0	0	
17-5. Water System, Potable	1	1	0	1	0	**(A, C)** When installed and serviced with water, all functions shall be operational. If not, system shall be drained prior to flight.

Chapter 5

OPERATIONAL PROCEDURES

5.1. Checklists. A checklist is not complete until all items have been accomplished. Momentary hesitations for coordination items, ATC interruptions, and deviations specified in the flight manual, etc., are authorized. Notes amplifying checklist procedures or limitations may be added to the checklists (in pencil).

5.1.1. Checklist Inserts. Units may supplement T.O. guidance with HQ AMC/DOV approved checklist inserts. These inserts may be placed at the end of the appropriate checklist or in an in-flight guide. All checklist inserts must have a POC. If any crewmember has recommendations or changes they should contact the POC. The POC will consolidate inputs and submit changes to HQ AMC/DOV for approval. Local in-flight guides and inserts not affecting T.O. guidance and procedures may be locally developed and OGV approved.

5.2. Duty Station. A qualified pilot will be in control of the aircraft at all times during flight. (***EXCEPTION:*** Unqualified pilots undergoing qualification training and senior staff members who have completed the Senior Officer Qualification Course). The aircraft commander, copilot, flight engineer, and navigator will be at their duty stations during all critical phases of flight. During other phases of flight, crewmembers may leave their duty station to meet physiological needs and perform normal crew duties provided a qualified pilot is in control of the aircraft and a qualified engineer is at the engineer's panel at all times. When additional aircrew personnel are on board, the observer's seat should be occupied to assist the crew in avoiding other aircraft during ground operations, takeoffs, departures, low-levels, penetrations, approaches and landings. Crewmembers will notify the pilot prior to departing assigned primary duty stations.

***EXCEPTION*:** On augmented missions when two or more ARs are scheduled and the crew contains more than one AR qualified AC, an AR AC (not necessarily the "A" coded AC on the flight orders) must be in the seat during refueling operations.

NOTE:

An additional pilot, if available (preferably C-5 qualified), should occupy the observer's seat during all ground operations, departures, approaches, and landings. In addition to scanning for other aircraft, the pilot in the observer's seat should maintain situational awareness and actively monitor the departure or approach being flown.

5.3. Flight Station Entry. ACs may permit passengers and observers access to the flight station during takeoff, climb, AR, descent, and landing only if seats with seat belts are available. Passengers and observers will not be permitted access to a primary crew position (P, CP, FE) regardless of its availability. In all cases, sufficient oxygen sources must be available to meet the requirements of AFI 11-202V3.

5.3.1 At his or her discretion, the AC may release seats for passenger accommodation in the flight station, relief crew compartment, or courier compartment. Before placing passengers on the flight deck, consider crew size, duration of flight, etc. A maximum of 20 crewmembers and passengers are authorized seating on the flight deck, subject to oxygen and life vest availability.

5.3.1.1. The AC will designate a qualified C-5 crewmember to ensure the safety of passengers on the flight deck when only two loadmasters are part of the crew and both are required in the troop

compartment. Comply with the following:

5.3.1.1.1. The designated crewmember will not be part of the primary crew and will be dedicated to passenger handling.

5.3.1.1.2. Passengers will be briefed according to T.O. 1C-5A-1.

5.3.1.1.3. The designated crewmember will log "other" time.

5.3.2. ACs may authorize passengers seated in the troop compartment to visit the flight deck during noncritical phases of flight if turbulence is not forecast and there is a vacant seat on the flight deck for each passenger brought forward. In addition, the following limits apply when the aircraft is at or above 10,000-feet:

5.3.2.1. Maximum altitude will be FL350.

5.3.2.2. Passengers will be escorted by a crewmember at all times.

5.3.2.3. A maximum of two escorted passengers may be in the cargo compartment at any time.

5.3.2.4. Oxygen must be readily accessible to crew and passengers transiting the cargo compartment.

5.4. Takeoff and Landing Policy. After thoroughly evaluating all conditions, the pilot in command will determine who accomplishes takeoff and landing and will occupy either the left or right seat during all takeoffs and landings.

5.4.1. A qualified AC will accomplish all engine-out approaches and landings and actual category II ILS approaches from the left seat unless specific circumstances dictate otherwise.

5.4.2. ACs with less than 150 hours in command will perform all takeoffs and landings from the left seat.

EXCEPTIONS: They may allow ACs or higher to perform takeoffs and landings from either seat when required for currency. ACs with less than 150 hours in command, but more than 100 hours in command may allow first pilots to perform takeoffs and landings from the right seat.

5.4.3. ACs will not make an approach and landing into an airfield requiring certification by the Airfield Suitability and Restrictions Report (ASRR) unless they have previously operated in to that airfield as a pilot, copilot, or observer and have reviewed briefing material in the ASRR or audiovisual program for that airfield.

5.4.4. Instructor or flight examiner pilots may allow copilots to takeoff and land from either seat.

5.4.5. First pilots on line training missions may make takeoffs and landings at all airfields at the discretion of the instructor pilot.

5.5. Right Seat Procedures.

5.5.1. Gear operation will be commanded by the pilot flying the aircraft, acknowledged by the pilot not flying, then activated by the pilot in the right seat. All flap operation will be commanded by the pilot flying the aircraft and activated by the pilot not flying after acknowledgment. On locals, instructor and evaluator pilots may operate flaps while flying from either seat if necessary to maintain their proficiency.

5.5.2. Emergency checklists. Either pilot may be required to accomplish an emergency checklist from either seat. When the left-seat (non-flying) pilot is required to accomplish the checklist, use the

following procedures:

5.5.2.1. Normally, checklist responses and actions will be made by designated crew position (P, CP).

5.5.2.2. Regardless of which pilot makes response or takes action, the pilot accomplishing the checklist must ensure compliance with all checklist items.

5.6. Outside Observer. Use available crewmembers to assist in outside clearing during all taxi operations and any time the aircraft is below 10,000-feet MSL.

5.7. Seat Belts:

5.7.1. All occupants will have a designated seat with a seat belt. Use of seat belts will be as directed by the aircraft commander, the flight manual, and **Chapter 13**. When children under the age of two are accepted as passengers, their sponsor must provide their own approved Infant Car Seat (ICS). Passengers may hand-carry ICS; these seats will be secured using the seat belt. Adults will not hold ICS during any phase of flight.

5.7.2. Crewmembers occupying pilot, copilot, or flight engineer positions will have seat belts fastened at all times in-flight, unless crew duties dictate otherwise.

5.7.3. All crewmembers will be seated with seat belts and shoulder harnesses fastened during taxi and critical phases of flight, unless crew duties dictate otherwise (the flight engineer is exempt from wearing the shoulder harness during ground operations). Additionally, anytime the seat belt advisory sign is illuminated, crewmembers will be seated with seat belt fastened, unless crew duties dictate otherwise. For AR, all aircrew members and passengers will be seated with seat belts fastened (unless crew duties dictate otherwise), and all equipment will be properly secured. Crewmembers performing instructor or flight examiner duties are exempt from seat belt requirements if not occupying a primary crew position; however, a seat with an operable seat belt will be assigned.

EXCEPTION: Crewmembers may taxi without the shoulder harnesses fastened for positioning and de-positioning the aircraft.

5.8. Aircraft Lighting. In accordance with AFI 11-202V3, and applicable T.O.s.

5.9. Portable Electronic Devices. Comply with AFI 11-202V3.

5.9.1. Unauthorized equipment (e.g., Walkman-type radios/tape players, CD players, etc.) will not be connected to the aircraft intercom, PA or radio systems.

5.10. **Smoking Restrictions.** Smoking is prohibited on board the aircraft.

5.11. **Advisory Calls.** The pilot flying will periodically announce intentions during departures, arrivals, approaches, and when circumstances require deviating from normal procedures. The following advisory calls are required:

NOTE:

“PF” refers to the pilot flying the aircraft; “PNF” is pilot not flying.

5.11.1. Nonprecision Approaches:

5.11.1.1. 100-feet above minimum descent altitude (MDA). (PNF)

5.11.1.2. "Minimums" at MDA. (PNF)

5.11.1.3. "Runway in sight" (Call when the runway environment is in sight.). (PNF)

5.11.1.4. "Go-around" (Call at missed approach point if the runway environment is not in sight or the aircraft is not in position for a safe landing.). (PNF)

5.11.2. Precision Approaches:

5.11.2.1. 100-feet above decision height (DH). (PNF)

5.11.2.2. "Land" (Call at DH if the runway environment is in sight and the aircraft is in a position for a safe landing.). (PNF)

5.11.2.3. "Go-around" (Call at DH if runway environment is not in sight or the aircraft is not in position for a safe landing.). (PNF)

5.11.3. Climb Out:

5.11.3.1. Departing X altitude for Y altitude. (PF)

5.11.3.2. Transition altitude. (PNF)

5.11.3.3. 1000-feet below assigned altitude. (PNF)

5.11.4. Descent:

5.11.4.1. Departing X altitude for Y altitude. (PF)

5.11.4.2. Transition level. (PNF)

5.11.4.3. 1,000-feet above assigned altitude. (PNF)

5.11.4.4. 1,000-feet above holding altitude. (PNF)

5.11.4.5. 100-feet above IAF altitude. (PNF)

5.11.4.6. 100-feet above procedure turn and final approach fix altitude. (PNF)

5.11.5 Other required calls:

5.11.5.1. Autopilot off/on. (PF)

5.11.5.2. Autothrottles off/on. (PF)

5.11.6. Any crewmember noting an apparent error in aircraft attitude, altitude, heading or airspeed, or any condition which may impact safety of flight, will immediately notify the pilot flying the aircraft. Deviations from prescribed procedures for the approach being flown will also be announced.

5.12. Communications Policy. The Air Force does not give a promise of confidentiality to aircrews regarding their recorded aircraft crew communications. Crewmembers are expected to maintain a high degree of cockpit professionalism and crew coordination at all times.

5.12.1. Sterile Flight Deck. Limit conversation to that essential for crew coordination and mission accomplishment during taxi, takeoff, air refueling, approach, landing, and any flight below 10,000-feet MSL (except cruise).

5.12.2. Aircraft Interphone:

5.12.2.1. Primary crewmembers will monitor interphone. Crewmembers will advise the AC prior to checking off interphone.

5.12.2.2. Interphone contact shall be established and maintained between the troop compartment loadmaster and a crewmember on the flight deck when passengers are on board. ***EXCEPTION***: The AC may allow the troop compartment loadmaster to go off interphone at cruise provided the public address (PA) system is operative.

5.12.2.3. Pilots will periodically announce their intentions when flying departures, arrivals, approaches, or when circumstances require deviating from normal procedures.

5.12.3. Command Radios:

5.12.3.1. The pilot not flying the aircraft normally makes all ATC radio calls.

5.12.3.2. In terminal areas the pilot, copilot, navigator, and FE will monitor the primary command radio, unless directed otherwise. Pilot not flying the aircraft or designated crewmember should monitor C2 frequencies on the inbound or outbound leg, unless otherwise directed.

5.12.3.3. Pilot operating command radios will inform the crew when the primary radio is changed.

5.12.3.4. One pilot should record and will acknowledge all ATC clearances. The FE or navigator will monitor clearance and ensure correct read back.

5.12.3.5. Both pilots will monitor UHF guard (VHF guard when appropriate) emergency frequency regardless of primary radio.

EXCEPTION: Only one pilot crewmember is required to monitor guard frequencies during rendezvous and AR.

5.12.3.6. Do not discuss classified information on the radios unless using secure voice and mission requirements dictate. Have Quick radio transmissions are not secure and will not be used to discuss classified information.

5.12.3.7. Unauthorized UHF frequencies will not be used to conduct Have Quick or secure voice training IAW Federal Communication Commission (FCC) directive.

5.12.4. Crew Resource Management (CRM) Assertive Statement “Time Out":

5.12.4.1. "Time Out" is the common assertive statement for use by all crewmembers. The use of "Time Out" will:

5.12.4.1.1. Provide a clear warning sign of a deviation or loss of situational awareness.

5.12.4.1.2. Provide an opportunity to break the error chain before a mishap occurs.

5.12.4.1.3. Notify all crewmembers that someone sees the aircraft or crew departing from established guidelines, the briefed scenario, or that someone is simply uncomfortable with the developing conditions.

5.12.4.2. As soon as possible after a "Time Out" has been called, the aircrew will take the following actions:

5.12.4.2.1. Safety permitting, stabilize the aircraft.

5.12.4.2.2. The initiating crewmember will voice his or her concerns to the crew.

5.12.4.2.3. The aircraft commander will provide all other crewmembers with the opportunity to voice inputs relative to the stated concerns.

5.12.4.2.4. After considering all inputs, the aircraft commander will direct the aircrew to continue the current course of action or direct a new course of action.

NOTE:

The aircraft commander is the final decision authority.

5.13. Transportation of Pets. Transporting pets (dogs and cats) on aircraft operated by or under the control of AMC in conjunction with the sponsors permanent change of station is authorized. Other pets or animals are normally prohibited, but may be moved according to DoDR 4515.13R.

5.14. Alcoholic Beverages. MAJCOM/DO/XO may authorize the dispensing of alcoholic beverages to passengers.

5.15. Runway, Taxiway and Airfield Requirements, and Wind Restrictions. Figure 5.1 specifies the minimum runway length, width, and taxiway widths for normal operations. In all cases ensure obstacle clearance requirements are met. Landing distance will not exceed runway available.

Figure 5.1. Runway and Taxiway Requirements.

Runway Length	**Runway Width**	**Taxiway Width**
***6,000-feet/1,830 meters	****147-feet/ 45 meters	75-feet/23 meters
***HQ AMC/DOA (AFRC NAF/DO for AFRC missions and ANG/DO for ANG missions) may approve operations down to 5,000-feet or 1,525 meters.		
****If a 180-degree turn is required, then 150-feet or 46 meters is required.		

5.15.1. If approach end overruns are available and stressed or authorized for normal operations, they may be used to increase the runway available for takeoff. Departure end overruns (if stressed and authorized) may also be used for landing if needed. Consult with HQ AMC/DOA for suitability guidance.

5.15.2. Aircrews and planning agencies will contact HQ AMC/DOVS (Airfield Analysis Branch) for all questions pertaining to airfield weight bearing capability and will review the ASRR prior to all off-station operations. HQ AMC/DOV is the waiver authority for airfield restrictions on AMC-directed missions (or MAJCOM equivalent for non-AMC-directed missions; e.g., ANG/DOO is the approval authority for ANG-directed missions). Waivers must be obtained prior to mission execution. Once a mission is executed the aircraft commander is responsible for determining airfield suitability based upon operational need. See ASRR for airfield certification requirements.

5.15.3. Runway Length for Takeoff and Intersection Takeoffs. Normally, takeoffs will be initiated from the beginning of the approved usable portion of the runway. The decision to make intersection takeoffs rests solely with the aircraft commander.

5.15.3.1. Intersection takeoffs may be accomplished provided the operating environment (i.e., gross weight, obstructions, climb criteria, weather, etc.) will allow a safe takeoff and departure.

5.15.3.2. When less than the entire runway is used, takeoff and landing data (TOLD) computations will be based on the actual runway remaining from the point at which the takeoff is initiated.

5.15.3.3. During operations on runways partially covered with snow or ice, takeoff computations will be based on the reported RSC or RCR for the cleared portion of the runway. A minimum of 50-feet either side of centerline should be cleared. If 50-feet either side of centerline is not cleared, then

compute data based on the uncleared portion up to 50-feet either side of centerline.

5.15.4. Runway length for takeoff will be greater than or equal to critical field length unless a minimum altitude is required at the departure end of runway (DER). (See **Chapter 6**, paragraph **6.16.1.2**).

5.15.5. Runway length for landing. Compute minimum required runway length for normal landings based on landing distance from 50-feet over threshold.

5.15.5.1. Compute landing distance with no reverse thrust.

EXCEPTION: When operational necessity dictates, landing distance may be computed using 2-engine reverse.

5.15.6. Runway condition reading (RCR) limitations. Minimum RCR for takeoff or landing is the lowest RCR depicted in the T.O. 1C-5A-1-1 (never less than 3). Normally, RCR values are not reported for taxiways and ramps. During periods of reported low RCR, taxiways and ramps may have an even lower RCR than reported for the runway.

5.15.6.1. When RCR or runway surface condition (RSC) reporting is not available, consider the runway surface as wet when there is sufficient water on the surface to cause a reflective glare or when rain is falling.

5.15.7. Wind Restrictions. Airfields will be considered below minimums for takeoff and landing when winds (including gusts) are greater than:

5.15.7.1. Maximum wind (any direction)—50 knots.

5.15.7.2. Maximum tailwind component—10 knots.

5.15.7.3. Maximum crosswind components, corrected for RCR, as specified in T.O. 1C-5A-1-1. For actual category II ILS approaches, the maximum crosswind component is 10 knots or as specified in T.O. 1C-5A-1-1, whichever is lower.

5.15.8. Arresting Cables (does not include recessed cables).

5.15.8.1. Do not land on approach end arresting cables. If the aircraft lands before the cable, the crew should contact the tower to have the cable inspected.

5.15.8.2. Do not takeoff or land over an approach end cable that has been reported as slack, loose, or improperly rigged by NOTAM, ATIS, or ATC.

5.15.8.3. *For AETC:* AETC crews on AETC missions will not takeoff or land over raised barriers.

5.16. Aircraft Taxi Obstruction Clearance Criteria:

Figure 5.2. Minimum Taxi Clearance Criteria.

Lateral clearance of component	To an obstacle	Without Wing Walker	With Wing Walker
Main Gear Pod	Less than 3-feet high	25-feet	10-feet
Outboard Nacelle	3-feet high, but less than 6-feet high	25-feet	10-feet
Wing Tip	6-feet or higher	25-feet	10-feet

5.16.1. Without a marshaller and wing walker(s), avoid taxi obstructions by at least 25-feet. With a marshaller and wing walker(s), avoid taxi obstructions by at least 10-feet.

EXCEPTION: Per AFI 11-218, *Aircraft Operation and Movement on the Ground*, aircraft may taxi without marshallers/wing walkers at home station along locally established taxi lines which have been measured to ensure a minimum of 10-feet clearance from any obstruction.

5.16.2. Comply with **Figure 5.2**. Use extreme caution when attempting to apply this criteria while scanning from inside the airplane. Factors such as wing tip growth in turns and the distance from the fuselage to the wing tip make the determination of actual clearance very difficult.

5.16.3. When taxi clearance is doubtful, use wing walker(s). If wing walkers are unavailable, deplane crewmembers to maintain obstruction clearance and provide marshalling (use AFI 11-218 signals). The AC should use marshallers and wing walkers, deplaned crewmembers, or a crewmember on interphone positioned at a door to act as an observer while turning on taxiways less than 75-feet wide (waiver required to operate on taxiways less than 75-feet wide). During night taxi operations, marshallers will have an illuminated wand for each hand. Wing walkers are only required to have one illuminated wand.

5.17. ***Not used.***

5.18. Fuel Jettisoning Procedures. Fuel jettison is limited to the minimum necessary for safe and effective flight operations. Except in the case of an emergency, prior to jettisoning fuel, crews will notify the appropriate ATC or flight service facility of intentions, altitude, and location. Inform the appropriate ATC or flight service facility when the operation is complete.

5.18.1. Jettison fuel only under the following circumstances:

5.18.1.1. Aircraft Emergency—immediate reduction of gross weight is critical to safe recovery of the aircraft.

5.18.1.2. Urgent Operational Requirements—immediate reduction of gross weight is necessary to meet urgent operational mission tasking.

5.18.2. Jettison areas should be off published airways and avoid urban areas, agricultural regions, and water supply sources.

5.18.3. Avoid circling descents.

5.18.4. Use jettison altitudes above 20,000-feet AGL to the maximum extent possible.

5.18.5. Use designated jettison areas to the maximum extent possible, except when safety of flight would be compromised.

5.18.6. If jettison is accomplished, record all pertinent data to include flight conditions, altitude, airspeed, air temperature, wind direction and velocity, type and amount of fuel, aircraft type and

position at time of jettison, time and duration of jettison activity, and reason jettison was accomplished. Retain this information for 6 months as documentation in the event of a claim against the government resulting from fuel jettison. The unit commander will determine the actual place of storage of this information.

5.19. ***Not used.***

5.20. BASH Programs. BASH programs are centralized unit efforts that provide information cross-feed, hazard identification, and a consolidated course of action. As a minimum, units must implement the following procedures:

5.20.1. Ensure compliance with the following Bird Watch condition restrictions:

5.20.1.1. Bird Watch Condition Low - No operating restrictions.

5.20.1.2. Bird Watch Condition Moderate - Initial takeoffs and final landings allowed only when departure and arrival routes will avoid bird activity. Local IFR/VFR traffic pattern activity is prohibited.

5.20.1.3. Bird Watch Condition Severe - All takeoffs and landings are prohibited. Waiver authority is local operations group commander or equivalent. Parent MAJCOM/DO waiver is required to operate at airfields not controlled by the Mobility Air Force (MAF).

5.20.2. Make every effort to not schedule takeoffs, landings, and low-levels from one hour before to one hour after sunrise and sunset during the phase II period. Also, significant bird hazards will be published in FLIP GP and the IFR Supplement along with the associated airfield operating hour restrictions and avoidance instructions.

5.20.3. When operating at airfields where no BASH program exists, aircraft commander's have the authority to delay takeoffs and arrivals due to bird condition. Coordinate actions through appropriate command and control authority.

5.20.4. Enroute. The aircrew should consider bird migratory patterns during enroute portion of the mission to minimize the potential of an in-flight bird strike. The Bird Avoidance Model (BAM) on HQ AFSC/SEF www site (http://www-afsc.saia.af.mil/AFSC/Bash/home.htm) provides BASH information, including regionalized CONUS bird migration, PFPS software overlay, and latest news. See AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*, for additional information.

5.21. Functional Check Flights (FCF) and Acceptance Check Flights (ACF). FCFs will be performed according to T.O. 1-1-300 and appropriate MAJCOM instructions. Additional guidance may be found in T.O. 1C-5A-6.

5.21.1. Terms and Abbreviations:

5.21.1.1. FCF—performed after accomplishing inspections or maintenance to assure the aircraft is airworthy and capable of mission accomplishment.

5.21.1.2. ACF—specifies guidelines for accepting new production aircraft, and to determine compliance with contractual requirements (e.g. C checks).

5.21.2. FCF Restrictions:

5.21.2.1. Some conditions requiring FCF according to T.O. 1C-5A-6 are (but not limited to):

5.21.2.1.1. Replacement, or removal and reinstallation, of fixed flight control surfaces. Fixed is defined as a surface that is not moveable in flight.

5.21.2.1.2. Major retrofit modifications or major structural repairs.

5.21.2.1.3. Adjustments or changes have been made that require flight to accomplish operational checks or calibration of accessories and/or auxiliary equipment.

5.21.2.1.4. Removal and replacement of any three engines or three fuel control units.

5.21.2.1.5. High speed taxi check.

5.21.2.1.6. Removal and replacement of any combination of three engines or non-associated fuel control units.

5.21.2.2. The operations group commander is responsible for the wing FCF program. He or she may waive a complete FCF and authorize an FCF to check only systems disturbed by maintenance, inspection, or modification. Units publish specifics in the **Chapter 10**.

5.21.2.3. Check flight should be conducted within the designated check flight airspace of the base from which the flight was launched, except when flight must be conducted under specific conditions, not compatible with local conditions or area restrictions.

5.21.2.4. Decision to approve a combined FCF and ferry flight is the responsibility of the MAJCOM/DO.

5.21.2.5. FCFs will be accomplished by the best qualified aircrews and will be designated FCF qualified to their assigned aircrew position by the operations group commander in a letter.

5.21.2.6. FCFs will normally be conducted in daylight, VMC conditions. However, the operations group commander may authorize a flight under a combination of visual flight rules (VFR) and instrument flight rules (IFR), "VFR on top" conditions. The flight will begin in VFR conditions. If the aircraft and all systems are operating properly, it may proceed IFR to penetrate cloud cover to VFR on top to continue the altitude phase of the flight.

5.21.2.7. FCF aborts: If a malfunction occurs during an FCF and is not related to the condition generating the FCF, and the original condition operationally checks good, the aircraft may be released for flight.

5.21.2.8. Operations group commander and deployed mission commander may authorize temporary waivers to these FCF procedures for aircrew qualification when operationally necessary. Permanent waivers require AMC approval.

5.22. Participation in Aerial Events. (IAW AFI 11-209, *Air Force Participation in Aerial Events*) Aerial events must be sanctioned and individually approved by the appropriate military authority and dated with the FAA. AFI 11-209 identifies events sanctioned for support and the approving authority for each type of event. In addition, AFI 11-209 stipulates that units participating in aerial events will ensure aerial activities are coordinated with the FAA through the regional Air Force representative.

5.23. Hand-held GPS. (Aircraft not modified by FMS/GPS) Carry a hand-held GPS on every mission, including local and off-station training missions (Exception: A hand-held GPS is not required for a local mission without passengers). The hand-held GPS, when operating properly, can provide useful information; however, it must never be used as the primary navigation source. Use of any hand-held GPS receiver that has not been EMI certified is restricted to operations above 10,000 ft AGL only. Any type

of hand-held GPS may be used unless interference is noted with any aircraft system. The actual use of the hand-held GPS rests with the aircraft commander. Its usage must never jeopardize safety. When aircrews deploy with or without an aircraft, (stage crews) each crew will deploy with a hand-held GPS.

5.23.1. Before using the hand-held GPS in-flight, aircrew members must receive training and aircraft must be capable of supporting the hand-held GPS equipment.

5.23.2 The hand-held GPS will not be used to update the INS unless the hand-held GPS position can be confirmed by another aircraft source (i.e. radar, TACAN, VOR, or navigator).

WARNING: Electrical problems have been reported on KLX-100 units. It is extremely important to insert all of the batteries in the proper orientation as shown in section 1.1.2, Figures 1-11 through 1-17 of the operators guide. The manufacturer confirms that if only one battery is inserted incorrectly, the unit will operate for 10-30 minutes. An increase in temperature may be noted followed by a crackling sound as the battery expands and ruptures. Be extremely careful as battery acid may leak from the bottom of the unit. A way to double-check proper insertion is to go to the GPS Setup page and check the bar graph showing battery power. Make sure it reflects battery strength near 100%. If a problem is detected, shut down the GPS immediately and disconnect unit from any external power source. Report the incident through proper channels. Do not attempt to remove the batteries. This action could cause injury to the individual and will impair investigation for warranty claims.

5.24. Radar Altimeter. During the descent and arrival phase of flight, any crewmember noticing the radar altimeter low altitude warning light illuminated will immediately notify the pilot flying the aircraft. Aircraft position and terrain clearance will be verified.

5.25. Aircraft Recovery from Unprepared Surfaces. Aircrews will normally not attempt to recover an aircraft after inadvertent entry onto unprepared surfaces not suitable for taxi. Using the appropriate equipment, ground crews will accomplish aircraft recovery. Unless an emergency situation dictates otherwise, aircrews may accomplish recovery only if there is no aircraft damage, the surface will support the aircraft, and the AC has coordinated with appropriate headquarters maintenance authorities through the TACC or MAJCOM/DO (AFRC NAF/DO for AFRC aircraft or missions and ANG/DO for ANG aircraft or missions).

5.26. Engines Running Offload or Onload (ERO) Procedures. HQ AMC/DO (AFRC operations commander for AFRC aircraft and ANG/DO for ANG aircraft prior to mobilization) or the director of mobility forces (DIRMOBFOR) may authorize ERO to expedite the flow of aircraft through airfields. Do not use ERO procedures when explosive cargo is involved except when authorized in the JA/ATT exercise operations order or contingency air tasking order.

5.26.1. The AC may approve onload or offload of personnel and small articles through the crew entrance door. Use T.O. 1C-5A-1, Operational Stop Procedures. Open only the crew entrance door and deplane the scanner to assure safety of enplaning or deplaning personnel.

5.26.2. ERO training may be conducted in conjunction with local training without HQ AMC/DO (AFRC operations group commander for AFRC and ANG/DO for ANG aircraft) approval.

5.26.3. Engine running crew changes during local training missions are authorized, provided the enplaning crew does not approach the airplane until a deplaning crewmember is positioned on headset outside the airplane.

Chapter 6

AIRCREW PROCEDURES

Section 6A—Pre-mission

6.1. Aircrew Uniform.

6.1.1. Wear the aircrew uniform, as outlined in AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*, and the appropriate MAJCOM Supplement, on all missions, unless otherwise authorized. When the Foreign Clearance Guide requires civilian attire, wear conservatively styled civilian clothing.

6.1.2. Each group commander will determine clothing and equipment to be worn or carried aboard all flights commensurate with mission, climate, and terrain involved.

6.1.2.1. All crewmembers will have Nomex gloves in their possession.

6.1.2.2. Wearing Nomex gloves is recommended for all primary crewmembers during engine start, taxi, takeoff, and landing.

6.1.2.3. Crewmembers will remove rings and scarves prior to performing aircrew duties.

6.1.3. Personnel will have the appropriate items of clothing in their possession when flying in Arctic and Antarctic regions.

6.1.4. See AFI 10-403, *Deployment Planning*, for mobility requirements.

6.2. Personal Requirements:

6.2.1. Passport. Carry a valid passport on all missions outside the 48 CONUS states. ***EXCEPTION***: Unit commanders may authorize newly assigned personnel who have applied for, but not yet received, a passport to act as crewmembers on missions scheduled to transit locations where passports are not required.

6.2.2. Shot Record. Ensure immunization requirements are met. Carry shot record on all missions outside the 48 conterminous states. C-5 crewmembers must maintain worldwide shot requirements.

6.2.3. Corrective Lenses. Comply with AFI 11-202V3.

6.2.4. Driver's License. A valid state driver's license is required on each TDY where use of US government general purpose vehicles may be required. Contact the local airfield manager if vehicle will be operated on the flight line.

6.2.5. Identification Tags. Two required for all flights.

6.2.6. FOD Hazards. Crewmembers will not wear wigs, hair pieces, rings, ornaments, pins, clips, other hair fasteners, or earrings in the aircraft or on the flight line.

EXCEPTION: Crewmembers may wear plain elastic hair fasteners and/or barrettes. These fasteners must not interfere with the wearing of headsets or the donning of oxygen equipment and will be accounted for before and after flight.

6.2.7. Flashlights. Each crewmember must carry an operable flashlight for night flights as defined in AFI 11-202V3.

6.2.8. Reflective Belts. Reflective belts (or suitable substitute) will be worn on the flightline during periods of darkness or reduced visibility.

6.2.9. Tool Kits. One flight engineer tool kit will be carried on all missions that do not have a crew chief on board.

6.3. Pre-mission Actions:

6.3.1. Theater Indoctrination.

6.3.1.1. Accomplish Theater Indoctrination Training prior to transiting the following areas:

6.3.1.1.1. Asia, Pacific, Australia, and Indian Ocean.

6.3.1.1.2. Africa and the Middle East.

6.3.1.1.3. Europe, Baltics, and Russia.

6.3.1.1.4. Caribbean, Central America, and South America.

6.3.1.2. Contents of the theater indoctrination folders should be tailored to the unit's specific mission. As a minimum, the following will be included:

6.3.1.2.1. Mission/Deployment Checklist. A locally developed checklist that includes mobility, training, and personnel requirements that should be accomplished prior to departure, and personal/professional items the aircrew must take with them.

6.3.1.2.2. Airspace/Airfield Review. FLIP, FIR/UIR/ADIZ procedures.

6.3.1.2.3. Airspace classifications, ASRR, and airport qualification videos (if available).

6.3.1.2.4. Theater Instrument Procedures. Required instruments and/or procedures for Non-DoD approaches, course reversal approaches, circling, holding, NDB approaches, host nation/Jeppesen approaches, and altimeter setting procedures.

6.3.1.2.5. Organized Track Systems. Minimum Navigation Performance Specifications (MNPS) airspace requirements; North Atlantic and Pacific region track systems.

6.3.1.2.6. Communication and Emergency Procedures. Command and control, over-water position reporting, lost communications procedures, emergency procedures, and weather information sources.

6.3.1.2.7. Border Clearance. Foreign Clearance Guide, customs, immigration, agriculture, insect and pest control, and diplomatic clearances.

6.3.1.2.8. Flight planning. DD Form 1801, **DoD International Flight Plan**, computer flight plan, Jeppesen approach plates and charts, theater weather conditions, fuel reserves and alternate requirements, equal time points/critical wind factors, and international NOTAMs.

6.3.1.2.9. Special Military Operations. Altitude reservations, due regard, and air refueling limitations.

6.3.1.2.10. Other Regulatory Requirements. General navigation procedures, life support equipment, hazardous cargo, crew rest/crew duty time, aircraft records/AFTO Form procedures, mission essential ground personnel/additional crewmembers, passenger handling, etc.

6.3.1.2.11. Location Information. Command and control/reporting procedures, maintenance problems, aircraft security, social customs and taboos, billeting, transportation, etc.

6.3.1.3. Units may consolidate information common to all geographic areas into one folder titled "general deployment information." The remainder of the folders would contain only theater specific information.

6.3.1.4. Aircrews will review theater indoctrination folders prior to mission/deployment. This review will be tracked in AFORMS as event G290.

6.3.1.5. Upon return, the aircraft commander will compile a trip report, when necessary, detailing lessons learned. The trip report will be placed in the theater indoctrination folder, closing the loop on ensuring validity of the folder.

6.3.2. Review tasking, itinerary, and ALTRV requirements.

6.3.3. Review applicable OPORD and FLIP.

6.3.4. Review the Foreign Clearance Guide for areas of operation. Obtain necessary diplomatic clearances where required.

6.3.5. Obtain required customs forms.

6.3.6. Complete TDY order request forms (if required).

6.3.7. Obtain computerized flight plans (CFP), as appropriate.

6.3.8. Ensure sufficient communications security (COMSEC) materials for duration of mission are obtained if required.

6.3.9. Review anti-hijacking procedures (see **Chapter 7)**.

6.3.10. Ensure physiological training, annual physical, immunizations, and standardization checks will remain current throughout the TDY period.

6.3.11. Obtain visas, if required.

6.3.12. Obtain terrain charts for unfamiliar destinations, if available.

6.3.13. Compile sufficient spare forms, flight orders, etc. to cover the TDY period.

6.3.14. Release available seats to passenger terminal.

6.4. Aircrew Publications Requirements. Primary crewmembers will carry the publications specified in **Figure 6.1** on all missions.

Section 6B—Pre-departure

Figure 6.1. Publication Requirements.

Publication	AC	CP	N	FE	LM
Technical Order (T.O.) 1C-5A-1				X*	X*
T.O. 1C-5A-1-1				X*	
T.O. 1-1C-1-23 (AR QUAL)	X		X	X*	
Abbreviated Checklist	X	X	X	X	X
AFI 11-2C-5V3 (applicable chapters)	X	X	X	X*	X*
T.O. 1C-5A-9					X*
T.O. 1C-5A-9-2					X*
AFI 11-202V3	X				
*__NOTE 1__: Loadmasters (LM) and flight engineers (FE) designated as "basic crew complement, instructors providing instruction, and students will carry all required publications. __NOTE 2__: Units will define a list of required publications for each crew specialty in **Chapter 10.**					

6.5. Airfield Certification. All crewmembers and staff mission planners will review airport qualification audiovisual slide tape programs as available before operating missions into unfamiliar airfields. In addition, aircrews will review the Airfield Suitability and Restrictions Report (ASRR) and should review GDSS for updates to airfield operability and weight bearing capability. The latest information is available through the World Wide Web (http://www.afd.scott.af.mil) or through GDSS/C2IPS.

6.6. Aircrew Intelligence/Antiterrorism Briefing. Prior to leaving home station on missions departing the CONUS, crews will receive an intelligence/antiterrorism briefing that will emphasize terrorist, enemy, and friendly political and military development in the area in which they will be flying. This will include AOR specific antiterrorism information directed by geographic CINCs. Once in theater, aircrews should receive an intelligence/antiterrorism update on initial arrival at a forward operating location (FOL) or en route stop and thereafter when significant developments occur. Report information of possible intelligence value to the local intelligence officers at the completion of each sortie.

6.7. Flight Crew Information File (FCIF) Procedures.

6.7.1. Review FCIF, volume 1, (index and safety-of-flight files, as a minimum) before all missions or ground aircrew duties. Update the FCIF currency record with the latest FCIF item number, date, and crewmember's initials or as specified.

6.7.2. Crewmembers delinquent in FCIF review or joining a mission en route will receive an FCIF update from a primary aircrew member counterpart on the mission. Instructor pilots who fly with general officers are responsible for briefing appropriate FCIF items.

6.7.3. Crewmembers not assigned or attached to the unit operating a mission will certify FCIF review by entering the last FCIF number and their initials behind their name on the file copy of the flight authorization or file copy of their crew orders or as specified by MAJCOM guidance.

6.8. Flight Crew Bulletins (FCB) (As Applicable).

6.8.1. FCBs are issued under provisions of AFI 11-202V2, *Aircrew Standardization/Evaluation Program*, and MAJCOM supplements. Operations group Stan/Eval will be the OPR for FCBs. Items in FCBs may include local procedures and policies concerning equipment and personnel generally not

found in any other publications.

6.8.2. All crewmembers should be cognizant of FCB contents.

6.9. Airfield Security. When departing on missions destined outside the CONUS, aircraft commanders should review applicable MAJCOM security publications.

6.10. Mission Kits. Carry mission kits on all operational missions. Suggested items include:

* Indicates mandatory for all missions away from home station.

6.10.1. Publications:

6.10.1.1. *AFI 11-401, *Flight Management* (and applicable MAJCOM supplements).

6.10.1.2. *AFI 23-202, *Buying Petroleum Products and Other Supplies and Services Off-Station.*

6.10.1.3. *AFJI 11-204, *Operating Procedures for Aircraft Carrying Hazardous Materials.*

6.10.1.4. *Airfield Suitability and Restrictions Report (ASRR).

6.10.1.5. *AMC Aircrew Border Clearance Guide (or MAJCOM equivalent).

6.10.1.6. *FCB.

6.10.1.7. *AMCPAM 11-2, *C-5 Fuel Planning.*

6.10.1.8. *AMCI 11-208, *Tanker/Airlift Operations.*

6.10.1.9. *AFI 11-289, *PHOENIX BANNER, SILVER, COPPER Operations.*

6.10.1.10. Wing or group operations plan (WOP or GOP).

6.10.2. Forms:

6.10.2.1. DD Form 1351-2, **Travel Voucher or Sub voucher**.

6.10.2.2. DD Form 1351-2c, **Travel Voucher or Sub voucher (Continuation Sheet)**.

6.10.2.3. DD Form 1610, **Request and Authorization for TDY Travel of DOD Personnel**.

6.10.2.4. *DD Form 1854, **US Customs Accompanied Baggage Declaration**.

6.10.2.5. *DD Form 2131, **Passenger Manifest**

6.10.2.6. *CF 7507, **General Declaration (Outward/Inward)**

6.10.2.7. *AF Form 457, **USAF Hazard Report**

6.10.2.8. *AF Form 651, **Hazardous Air Traffic Report (HATR)**

6.10.2.9. *AF Form 1297, **Temporary Issue Receipt**

6.10.2.10. *AF Form 2282, **Statement of Adverse Effect-Use of Government Facilities**

6.10.2.11. *AF Form 4097, **C-5 Aircraft Fatigue Tracking Worksheet**

6.10.2.12. *AF Form 4054, **Performance and Fuel Management Log**

6.10.2.13. *AF Form 4098, **C-5 TOLD Card Worksheet**

6.10.2.14. *AF Form 4099, **C-5 Pilot's TOLD Card**

6.10.2.15. *AF Form 4101, **Relay Logic Landing Gear Malfunctions**

6.10.2.16. *AF Form 4075, **Aircraft Load Data Worksheet**

6.10.2.17. *AMC Form 41, **Flight Authorization** (or as MAJCOM prescribed) and include AF Form 1631, **NATO Travel Orders** (when required).

6.10.2.18. *AMC Form 43, **AMC Transient Aircrew Comments**.

6.10.2.19. *AMC Form 54, **Aircraft Commander's Report on Services/Facilities**

6.10.2.20. *AMC Form 97, **AMC Unusual Occurrence/Bird Strike Worksheet**

6.10.2.21. *AMC Form 196, **Aircraft Commander's Report on Crewmember**

6.10.2.22. *AMC Form 423, **MIJI Incident Report Worksheet**.

6.10.2.23. HMS Customs Declaration.

6.10.2.24. Japanese Customs Declaration.

6.10.2.25. *Mission frag (when applicable).

6.10.3. Miscellaneous:

6.10.3.1. *Box car seals.

6.10.3.2. *Masking tape.

6.10.3.3. Pad lock and key.

6.11. Route Navigation Kits.

6.11.1. A route navigation kit is issued at home station and remains with the aircraft until return to home station. Kits contain sufficient quantities of material to cover the planned mission and global operations as required.

6.11.2. The agency responsible for route navigation kits will ensure the aircraft has a route navigation kit containing at least those items in **Figure 6.2.**

6.11.3. Route navigation kits are issued in two parts:

6.11.3.1. Part I—Material to cover the planned mission.

6.11.3.2. Part II—Maps, charts, and flight information publications for global operation, excluding items in part I.

6.11.4. Minimum contents of route navigation kits are according to Figure 6.2. The minimum contents are based on an augmented crew with no navigator.

6.11.5. Local area navigation kits may be used in lieu of route navigation kits on local unit training sorties. Content of these kits is a local unit decision.

Figure 6.2. Route Navigation Kit Contents.

Item	Part I (Applicable to Area of Operation)	Part II (Global)
FLIP Planning (Sections GP, AP/1, AP/2, AP/3)	1	1
FLIP IFR Supplement	2	1
FLIP Flight Information Handbook	2	1
FLIP En Route (High and Low)	2	1
FLIP Instrument Approach Procedures (High and Low)	3	1
Standard Instrument Departures (SID) (East and West US volumes 1 and 2)	3	1
Instrument Departures Europe and North Africa (High and Low)	3	1
Standard Terminal Arrival Routes (STARs)	3	1
OPREP-3 Report Format	1	1
Maps and Charts	As required	1 each GNC
FLIP VFR Supplement	1	
DD Form 1898, **AVFuels Into-Plane Sales Slip**	5	
AFI 23-202, *Buying Petroleum Products and Other Supplies and Services Off-Station*	1	
AF Forms 15/15a, **USAF Invoice/Invoice Envelope**	5	
AF Form 72, **Air Report (AIREP)**	5	
AF Form 315, **United States Air Force AVFuels Invoice**	10	
AF Form 664, **Aircraft Fuels Documentation Log**	5	
AF Form 4115, **Flight Plan and Record**	1 each route segment	
AF Form 4053, **Pilot's INS Flight Plan and Log**	1 each route segment	
AF Form 4052, **C-141/C-130/C-5/C-17 Refueling Computation**	5	
AMCPAM 11-2, *C-5 Fuel Planning*	1	

6.12. Briefing Requirements.

6.12.1. Special Briefings. Contact the local current operations or controlling agency (e.g. command post) to confirm mission requirements. Controlling agencies provide information necessary to complete mission planning. The AC and the controlling agency jointly share the responsibility to identify special briefing requirements. These briefings include, but are not limited to the following: buffer zone; electronic warfare activities; meaconing, intrusion, jamming, and interference (MIJI); diplomatic clearance; hazardous cargo; airfield qualification program; anti-hijacking procedures (if different from standard); operational-safety supplements to flight manuals (if issued within last-72 hours); and specialized procedures for Joint Chiefs of Staff (JCS) contingency operations, operational readiness inspections (ORI), etc.

6.12.2. Aircraft Commander Briefings. Brief crewmembers on the details of the missions. Include the following:

6.12.2.1. Mission requirements—Mission identifier, itinerary, fuel load, aircraft location, departure time, station time.

6.12.2.2. Special requirements—Flight orders, trip kits, navigation kits, authentication documents, special reports.

6.12.2.3. Personal requirements—Personal equipment, passports and shot records, FCIF.

6.12.2.4. Normal procedures—Crew, interphone, radio discipline, en route stop plan, outside vigilance, student responsibility, sabotage and stowaway check, hijacking, aircraft security, surveillance for narcotics, weapons requirements.

6.12.2.5. Emergency procedures and ground egress.

6.12.2.6. Crew conduct—Personal conduct in foreign areas. Personal articles on aircraft.

6.12.2.7. Intelligence—General situation, current political and military situation, airfield security, en route threats, and special support (if applicable).

6.12.2.8. Air refueling procedures (see **Chapter 15**).

6.12.2.9. Special operations procedures (see **Addendum B**).

6.12.2.10. Airdrop procedures (see **Chapter 19**).

6.12.3. Weather Briefings. Request a written weather briefing on DD Form 175-1, **Flight Weather Briefing** or AMC Form 181, **Mission Weather Briefing.** ***EXCEPTION***: verbal weather briefings are acceptable for local training missions. Obtain a briefing on current weather, trends, and forecast for the proposed route, destination, and alternates. All primary crewmembers will attend the weather briefing unless crew duties dictate otherwise. If the flight will transit non-Air Force bases, crews must make arrangements to ensure adequate weather support facilities and services are available. If adequate services are not available crews will obtain weather support through any means available to ensure required weather data is in their possession prior to mission accomplishment. When face-to-face briefings are not possible, obtain a telephone weather briefing (precedence up to and including IMMEDIATE is authorized). The designated MAJCOM regional briefing stations provide the telephone briefing for CONUS flights.

6.12.4. Buffer Zone. Prior to operating an aircraft within or adjacent to an established buffer zone, the pilot will ensure primary crewmembers are briefed on current buffer zone procedures outlined in appropriate directives.

6.12.5. Peacetime and Wartime SAFE PASSAGE Procedures. Pilots must be familiar with peacetime and wartime safe passage of friendly military aircraft (if applicable).

6.13. Call Signs:

6.13.1. Training Missions. Aircraft will use the unit static call sign prefix followed by a 2-digit suffix assigned by the parent unit.

6.13.2. Operational Missions. Aircraft will use call signs assigned by OPORD, FRAG, or diplomatic clearance. If no call sign has been assigned to the mission, aircraft will use the “REACH” call sign followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number (or as required by diplomatic clearance). Complete flight plans as follows:

6.13.2.1. On the DD Form 1801, item 7, put the letters "RCH" followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number, or the diplomatically cleared call sign.

6.13.2.2. On the DD Form 175, aircraft call sign block, put “RCH” followed by the last digit of the year the aircraft was built and the last 3 digits of the aircraft tail number, or the diplomatically cleared

call sign.

6.13.3. The Reach 01, 15, and 21 call signs will only be used by the AMC/CC, 15 AF/CC, and the 21 AF/CC, respectively.

6.14. Instrument Flight Rules. Conduct flight operations under IFR to the maximum extent possible without unacceptable mission degradation. This does not preclude VFR training to maintain proficiency in mission essential VFR operations.

6.15. Flight Plan Verification:

6.15.1. Aircrews should acquaint themselves with the mission and individual sortie requirements to ensure successful mission accomplishment. Wing and squadron staff should monitor crew activity and be available to resolve problem areas.

6.15.2. Computer Flight Plan (CFP) Use. Contracted CFPs or CFPs available from Det 1, AMC CPSS are the official sources of performance, navigation, and climatic data, including en route wind information. If stand-alone microcomputer based plans are used, each mission segment should utilize best wind data available. Only current, command validated (HQ AMC/DOV) microcomputer programs will be used for flights involving C-5 aircraft.

6.15.3. Flight crews may manually compute flight plans, use mainframe based or contracted CFPs, or utilize CFPs provided by the staff. CFPs should be utilized to the maximum extent practical. The flight crew has final responsibility for accuracy of the flight plan used.

6.15.4. Computer flight plans will be verified by the flight crew for route definition and fuel computation accuracy prior to departure. Range summary charts in AMCPAM 11-2, *C-5 Fuel Planning*, will be used to determine the validity of CFP fuel burn rates. Pass any flight plan discrepancies to the Tanker Airlift Control Center (TACC). When reporting incorrect CFPs, pass the CFPI and the plan number to the flight planner.

6.16. Departure Planning. IAW AFI 11-202V3, AFMAN 11-217, this AFI and the appropriate MAJCOM supplement.

6.16.1. Gross Weight (GW). Ensure that the aircraft does not exceed the maximum GW, zero fuel weight (ZFW), or center of gravity (CG) specified in the aircraft flight manual. GW may be further restricted by operating conditions such as icing, temperature, pressure altitude, runway length and slope, aerodrome weight bearing capacity, departure maneuvering, and known limiting obstacles.

6.16.1.1. Climb Gradient. Takeoff GW must never exceed the maximum recommended take-off GW for 3-engine climb performance. (T.O. 1C-5A-1-1, Figure A3-12). For planned gear down flights, use variant configuration data to ensure this requirement is met.

6.16.1.2. Critical Field Length (CFL). Takeoff GW must never exceed that which would require CFL in excess of the runway available. In some cases, a minimum altitude is required at the departure end of runway (DER). The runway available must exceed CFL by at least 50-feet for every 1 foot of altitude required at DER.

6.16.1.3. DER height requirements.

6.16.1.3.1. Standard instrument departure (SID). OPRs for SIDs are identified on each individual SID. They are either Federal Aviation Administration (FAA), United States Army (USA), United States Navy (USN), United States Marine Corps (USMC), or United States Air Force (USAF). On

non-DoD SIDs, the agency that wrote the SID will also be identified (in parentheses immediately to the right of the Chart Reference Number). For example:

6.16.1.3.1.1. SL-000.00 (USA) would indicate a DoD SID where the US Army is both the OPR and the agency that wrote the SID.

6.16.1.3.1.2. (USAF) SL-000.00 (RAF) would indicate a non-DoD SID where the USAF is the military department that requested publication and serves as the OPR, but the Royal Air Force is the agency that wrote the SID. Use the agency that wrote the SID to determine the required DER height.

6.16.1.3.2. Required DER heights depend on the agency that wrote the SID.

6.16.1.3.2.1. USAF, USN, or USMC SID: Zero-feet.

6.16.1.3.2.2. US Army and FAA SID: 35-feet.

6.16.1.3.2.3. Foreign Civil SID (must be an ICAO member nation listed in FLIP GP): 16-feet.

6.16.1.3.2.4. Foreign Military SID (NATO, ICAO member nation listed in FLIP GP): 35-feet.

6.16.1.3.2.5. Foreign Military SID (Non-NATO, ICAO member nation listed in FLIP GP): 16-feet.

6.16.1.3.3. Radar Vector, Published IFR Departure Procedure or VFR Departures.

6.16.1.3.3.1. USAF, USN, or USMC Airfield: Zero-feet.

6.16.1.3.3.2. US Army and FAA Civil Airfield: 35-feet.

6.16.1.3.3.3. Joint Use Airfield within the United States: 35-feet.

6.16.1.3.3.4. Foreign Civil Airfield (must be an ICAO member nation listed in FLIP GP): 16-feet.

6.16.1.3.3.5. Foreign Military Airfield (NATO, ICAO member nation listed in FLIP GP): 35-feet.

6.16.1.3.3.6. Foreign Military Airfield (Non-NATO, ICAO member nation listed in FLIP GP): 16-feet.

NOTE:

There is no standard or easy way for crews to determine DER height requirements in some cases. Therefore, when using departures other than those listed above, or when any doubt exists about which DER height to use, plan to cross the DER at 35-feet (minimum) unless you can ascertain a different DER height requirement from the appropriate authority. If aircraft performance will not allow crossing the departure end of the runway at the required height, the proposed departure route will be examined using a current aeronautical chart of appropriate scale to ensure performance is sufficient to clear all obstacles. The crew must advise the air traffic control (ATC) agency involved that they cannot meet the SID requirement.

6.16.2. Departure Routing/Climbout Performance. Regardless of the type of departure flown (SID, IFR Departure Procedure, Specific ATC Departure Instructions, Diverse Departure, or VFR), the aircraft must be able to achieve the published climb gradient (for the runway to be used) with all

engines operating (T.O. 1C-5A-1-1, Figures A3-10 or A3-11, as applicable), and be able to vertically clear all obstacles within the climbout flight path with one engine inoperative (T.O. 1C-5A-1-1, Figures A3-15 or A3-16, as applicable). ***(EXCEPTION:*** See paragraph **6.17.6**). If no minimum climb gradient is published, use 200 ft/NM minimum with all engines operating and 152 ft/NM minimum with one engine inoperative. If a higher required climb gradient is published or required for radar vectors, use that climb gradient as the minimum with all engines operating, and use that climb gradient minus 48 ft/NM as the minimum with one engine inoperative. This only works at airfields having an instrument approach. If the field does not have an instrument approach, then no obstacle survey has been conducted and you cannot determine the minimum required climb gradient. An IFR departure is not authorized from fields with no instrument approach.

6.16.2.1. Published IFR Departure Procedures. Published IFR departure procedures are available at some civil and military fields to assist in avoiding obstacles during climb to the minimum en route altitude (MEA). Airfields with published IFR departure procedures will have the inverted triangle with a white "T" symbol printed on the approach plates and SIDs. When using Jeppesen publications, IFR departure procedures will be on the airfield diagram page which is typically on the reverse side of the airport's first approach. A climb gradient and/or specific routing and/or alternate takeoff weather minimums will normally be specified with a published IFR departure procedure. When flying a published IFR departure procedure, depicted routing and climb gradients must be flown to avoid obstacles. The alternate takeoff weather minimums allow aircraft to depart with minimum ceiling and visibility. USAF C-5 aircrews are not authorized to use these alternate takeoff weather minimums.

NOTE:

If the published IFR departure procedure does not include either a routing or a minimum climb gradient (i.e., it includes only alternate takeoff weather minimums), then an IFR departure from that airfield is not authorized unless you fly a SID, depart via radar vectors, or use a diverse departure.

6.16.2.2. Specific ATC Departure Instructions (specific climbout instructions or “radar vectors”). Crews may depart via specific ATC departure instructions. Terrain/obstacle clearance is not provided by ATC until the controller begins to provide navigational guidance, i.e., radar vectors. Even if planning to depart via specific ATC departure instructions, the crew should still have the SID on board (if published).

6.16.2.3. Diverse Departures. The airfield has been assessed for departure by TERPS personnel and no penetration of the obstacle surfaces exist. An aircraft may depart the field, climb to 400-feet above the departure end of the runway elevation, turn in any direction, and if a minimum climb gradient of 200 ft/NM is maintained be assured of obstacle clearance. This is normally indicated on DoD/NOAA publications by the absence of any published departure procedures.

6.16.2.4. VFR Departures. VFR departures are authorized when required for mission accomplishment. The weather at takeoff must permit a VFR climb to an IFR MEA, an appropriate IFR cruising altitude or an altitude where radar vectors can be provided.

NOTE:

In no case will VFR departures be flown in lieu of obstacle clearance planning.

6.17. Obstacle Clearance Planning.

6.17.1. Obstacle Identification Surface (OIS). Obstacle identification for SID purposes (FAA Handbook 8260.3B, AFJMAN 11-226, *US Standard for Terminal Instrument Procedures (TERPS))*

are those objects that penetrate an OIS of 40:1 (152 ft/NM), starting at the required DER height (if any). Calculation of the OIS on a SID continues until the SID reaches an MEA or until the SID terminates. Climb gradients of 200 ft/NM will provide at least 48 ft/NM clearance above all obstacles that do not penetrate the OIS. Complying with published climb gradients found on a SID or IFR departure procedure will provide at least 48 ft/NM clearance above all obstacles that do penetrate the OIS. The aircraft commander must be aware and thoroughly brief all significant obstacles along the departure flight path.

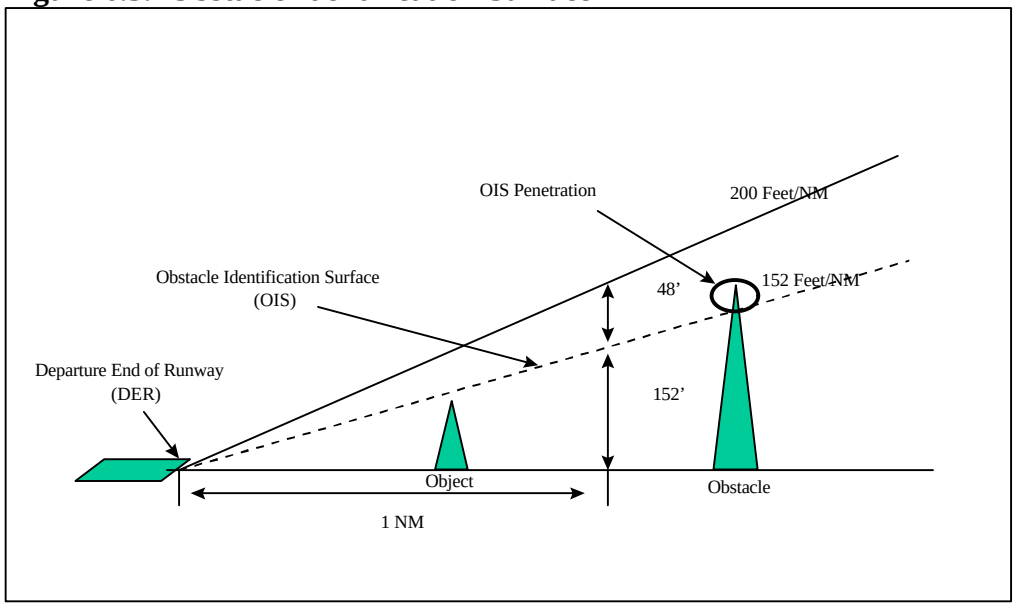
6.17.1.1. If no obstacles penetrate the 152 ft/NM slope, IFR departure procedures are not published.

6.17.1.2. If obstacles do penetrate the slope, avoidance procedures are specified. These procedures may be: a climb gradient greater than 200 ft/NM; detailed flight maneuvers; a ceiling and visibility to allow obstacles to be seen and avoided; or a combination of the above. In extreme cases, IFR takeoff may not be authorized for some runways. Aircrews will not use any departure procedure that requires a certain ceiling and visibility to see and avoid an obstacle.

6.17.1.3. Climb gradients are specified when required for obstacle clearance. Crossing restrictions in the SID's may be established for traffic separation or obstacle clearance. When no gradient is specified the pilot is expected to climb at least 200 ft/NM to the MEA, unless required to level off by a crossing restriction.

6.17.1.4. Climb gradients may be specified to an altitude/fix, after which the normal climb gradient applies.

Figure 6.3. Obstacle Identification Surface



6.17.1.5. The AMC Airfield Suitability and Restrictions Report (ASRR) is an excellent source for obstacle information. However, it is not a stand-alone document. It is intended to supplement published climb gradients and obstacle information found on SIDs and Published IFR Departure Procedures.

6.17.1.6. Aircrews may call HQ AMC/DOVS (DSN 576-3112) after reviewing the ASRR and GDSS if more information is required.

NOTE: Whereas terrain charts can be used to maintain situational awareness and determine the best way to return to the field in case of an emergency, they can be a bad source of obstacle information. See warning after paragraph **16.4.7.7** and **Figure 16.3**.

6.17.2. Objects penetrating the OIS may or may not be depicted (they definitely will not be depicted on civil procedures). Objects that do not penetrate the OIS will not normally be depicted.

6.17.3. SIDs simplify ATC procedures while providing safe routing to the en route structure, but should not be used as the sole source of obstacle information for departure planning. If SIDs are used as such, inadequate engine out obstacle clearance may result. SIDs, Instrument Departure procedures and instrument approach plates, should be used to determine the distance and height values for all significant obstacles along the flight path.

6.17.4. The controlling obstacle is defined as the obstacle requiring the greatest climb gradient within the flight path. The gradient is measured from the end of the runway not CFL. Obstacles are not normally depicted on SIDs when climb gradients of less than 152 ft/NM are required to clear them.

6.17.5. In order to fly any departure, aircrews must ensure they can meet the published/required climb gradient with all engines operating (200 ft/NM if none published/required). If the aircraft is not capable of meeting an ATC all engine climb gradient restriction, ATC coordination is required prior to takeoff. In addition, aircrews will accomplish the following to ensure they can vertically clear all obstacles on or reasonably near the climbout/emergency return flight path with one engine inoperative:

CASE 1. If both climb gradient and obstacle data is known: The aircraft must be able to achieve the published climb gradient (for the runway to be used) with all engines operating. The aircraft must also be able to vertically clear all obstacles within the climbout flight path with one engine inoperative.

CASE 2. If only obstacle information is available: The aircraft must be capable of maintaining a minimum climb gradient of 200 ft/NM with all engines operating and be able to vertically clear all obstacles within the climbout flight path with one engine inoperative.

CASE 3. If only climb gradient information is available. Ensure that the aircraft can maintain that climb gradient with all engines operating. For engine out computations:

<u>If the required gradient is 200 ft/NM:</u> the computed climb out factor (COF) should be equal or less than 71. However, if it can be positively determined that all obstacles within the first three miles of flight are at least 35 ft below the OIS, then the COF may be as high as 75.
<u>If the required climb gradient is greater than 200 ft/NM:</u>
Step 1. Determine the distance the climb gradient needs to be maintained. If the climb gradient is to be maintained to a certain fix, measure the distance to the fix. If the climb rate is to be maintained until a certain height above MSL, then subtract the take off zone elevation from that height. Divide the result by the climb gradient. This will yield the distance in NM from the runway. (Example: Take off zone elevation 500 ft MSL climb gradient 250 ft/NM until 1250 ft MSL 1250-500=750 750/250=3 NM from the runway.)
Step 2. Subtract 48 from the required climb out rate (Example: required climb out rate 250 ft/NM 250-48=202)
Step 3. Multiply the result from Step 2 by the distance from Step 1 to compute an effective obstacle height (AGL) for the climb gradient. (Example 202 X 3 = 606 ft AGL)
Step 4. Use the normal obstacle procedures (T.O. 1C-5A-1-1, Fig A3-15 or A3-16, as applicable) to compute whether you can clear that obstacle with an engine out.

6.17.5.1. In the event that the engine out climb capability is not sufficient to clear all obstacles, the crew will consider the following:

6.17.5.1.1. Downloading cargo

6.17.5.1.2. Downloading fuel

6.17.5.1.3. Delaying the mission until climatic conditions allow for sufficient performance to clear all obstacles

6.17.5.1.4. Coordinating alternate departure procedures with the controlling agency that will provide obstacle clearance.

6.17.6. If none of the options in paragraph **6.17.5.1** are feasible, the crew may depart on an IFR departure only if all the following conditions are met:

6.17.6.1. The aircraft is capable of achieving the minimum published/required climb gradient (200 ft/NM if none published/required) with all engines operating.

6.17.6.2. Day/VFR conditions exist on the entire departure and planned emergency return routing.

6.17.6.3. The aircraft commander has determined through a review of all applicable sources that, in the event of an engine failure, the planned departure and emergency return routing will allow for obstacle avoidance.

6.17.6.4. The planned emergency route is briefed to the entire crew.

6.17.6.5. TRT standing takeoff procedures are used.

NOTE:

ANG aircrews require home unit OG/CC approval prior to exercising this option.

6.17.7. In the event of an engine failure, the crew will advise ATC if they are unable to comply with the published minimum climb gradient. Obtain radar vector or avoid all obstacles visually.

6.17.8. The following procedures apply for all departures:

6.17.8.1. The pilot will provide the obstacle height, distance, and gradient information necessary for performance computations to the flight engineer. The appropriate sectional or terrain chart should be reviewed in addition to the SID. The following guidelines should help eliminate obstacles that are not a factor.

6.17.8.2. All obstacles on the SID will be considered. If no distance is published, use appropriate aeronautical chart (if available) to estimate flying distance to depicted obstacles.

6.17.8.3. When utilizing other sources for obstacle information, consider all obstacles which fall within the departure or emergency return routing.

6.17.8.4. Escape routing must always be planned to ensure obstacle clearance and emergency recovery during engine failure.

6.18. Alternate Planning.

6.18.1. Choose alternates that best meet mission requirements and conserve fuel. Those selected should not be within the same terminal area, if terminal forecasts are marginal. Select alternates that are not restricted by FLIP, Foreign Clearance Guide, or diplomatic clearances and are compatible with the mission load and performance characteristics of the aircraft.

6.18.2. The aircraft commander retains final authority in the choice of alternates; however, selection by support agencies normally should be used if they meet the above criteria and the aircraft has already been serviced.

6.18.3. Alternates selected must meet alternate airport weather requirements according to AFI 11-202V3.

6.19. Departure Alternates.

6.19.1. A departure alternate is required if ceiling or visibility is below landing minimums for an available approach (at departure aerodrome). Do not use category II ILS minimums to determine if a departure alternate is required

6.19.2. Suitability of Departure Alternates. When a departure alternate is required, the aircraft must be capable of maintaining the MEA or MOCA, whichever is higher, to the alternate using one engine out performance criteria. To qualify as a departure alternate the airfield must meet one of the following conditions:

6.19.2.1. Existing weather at an alternate within 30 minutes flying time must be equal to or better than the published approach minimums and forecast to remain so until 1 hour after takeoff, but in no case forecast to be lower than 200-1/2 (RVR 24), or;

6.19.2.2. The existing weather at an alternate within 2 hours flying time must be at least 500-1 above the lowest compatible published approach minimums, but in no case lower than 600-2 for a precision approach or 800-2 for a non-precision approach, and forecast to remain so for 1 hour after ETA at the alternate.

6.20. Destination Requirements (*for filing purposes*). The forecast destination weather will be according to AFI 11-202V3, and the following:

6.20.1. File two alternates when:

6.20.1.1. Forecast visibility (intermittent or prevailing) is less than published for an available DoD or NOAA precision approach.

6.20.1.2. Forecast is less than VFR for any destination where an NDB is the only available approach.

6.20.1.3. Forecast ceiling or visibility (intermittent or prevailing) is less than published for all other approaches. For approaches with no published ceiling requirement (for example Jeppesen approaches), the minimum required ceiling shall be computed by taking the published HAA or HAT and rounding it up to the nearest one hundred feet or as determined by MAJCOM TERPS review. For example, a Jeppesen VOR approach with a published HAA of 642-feet would require a forecasted ceiling of 700-feet.

6.20.1.4. Forecast surface winds (intermittent or prevailing) exceed limits corrected for RCR.

6.20.2. File an alternate, regardless of forecast weather, when the departure or destination aerodrome is outside the 48 CONUS states.

6.20.3. When filing to a remote or island destination, aircrews may use 1+15 holding fuel (in lieu of an alternate and 45 minutes holding fuel). Compute holding fuel using planned destination gross weight at FL 200. A remote or island destination is defined as any aerodrome which, due to its unique geographic location, offers no suitable alternate (civil or military) within 2 hours flying time. The forecast weather at the remote or island destination must meet the following criteria:

6.20.3.1. The prevailing surface winds, corrected for RCR, must be within limits at ETA and forecast to remain so for 2 hours thereafter. In addition; the prevailing ceiling and visibility must be equal to or greater than published minimums for an available non-precision approach, excluding ASR , for ETA plus 2 hours.

NOTE:

If a precision approach is available, the ceiling or visibility may be intermittently below non-precision approach minimums, but not below precision approach minimums (for ETA plus 2 hours).

6.20.4. When filing to a destination where the alternate is located in Alaska or at latitudes greater than 59 degrees, aircrews will use 1+15 holding fuel (computed using planned alternate gross weight at FL 200) in lieu of 45 minutes holding fuel.

6.21. Adverse Weather:

6.21.1. Do not takeoff under conditions of freezing rain, light freezing rain or freezing drizzle.

6.21.2. During flight, use any means available to avoid thunderstorms by at least:

6.21.2.1. 20 NMs at or above flight level (FL) 230.

6.21.2.2. 10 NMs below FL 230.

6.21.2.3. 5 NMs for aerial delivery (i.e., airdrop, low level, etc.) operations below FL 230 provided outside air temperature is at or above 0 degrees Celsius at flight altitude. Avoid gust fronts and winds preceding a rapidly moving thunderstorm.

NOTE:

Aircraft damage may occur 20 miles or more from any thunderstorms. Aircrews must familiarize themselves with information on thunderstorm development and hazards. Refer to AFH 11-203, *Weather for Aircrews*.

6.21.3. Aircrews should avoid flying in areas of recently dissipated thunderstorms and advected clouds downwind of thunderstorms. Crew actions should tend to the side of safety.

6.21.4. The use of ground-based radar as a means of thunderstorm avoidance should be used only to assist in departing an inadvertently penetrated area of significant weather. It should never be considered a normal avoidance procedure.

6.21.5. Do not fly directly above (within 2,000-feet) thunderstorms or cumulonimbus clouds. If unable to vertically clear thunderstorms or cumulonimbus clouds by at least 2,000-feet, you must avoid them by using the above criteria.

6.21.6. In order to minimize exposure to thunderstorm hazards when approaching or departing an airport in an area where thunderstorms are occurring or are forecast:

6.21.6.1. Attempt to maintain VMC.

6.21.6.2. Maintain at least 5 NMs separation from heavy rain showers.

6.21.6.3. Avoid areas of high lightning potential, i.e. clouds within plus or minus 5,000-feet of the freezing level.

NOTE:

Approaches or departures may be accomplished when thunderstorms are within 10 NMs. The thunderstorms must not be producing any hazardous conditions (such as hail, lightning, strong winds, gusts fronts, heavy rain, wind shear, or microburst) at the airport, and must not be forecast or observed to be moving in the direction of the route of flight (to include the planned missed approach corridor, if applicable).

6.21.7. Do not fly into an area of known or forecast moderate or greater mountain wave turbulence. Crews should use good judgment when flying into any area conducive to mountain wave turbulence, and avoid these areas of potential turbulence when possible.

6.21.7.1. Mountain wave turbulence is normally a predictable condition. Forecasters at base weather stations, using guidance products from weather centers, can advise crews of the potential for encountering mountain wave turbulence along planned routes of flight.

6.21.7.2. Weather data availability in mountainous regions and forecast model limitations prevent the prediction of all events.

6.21.7.3. Crews must be familiar with the causes of mountain wave turbulence and the characteristic clouds that generally forewarn its presence.

6.21.8. Flight into areas of forecast or reported severe icing or severe turbulence is prohibited.

6.21.9. SIGMETS. National Weather Service in-flight weather advisories are not limiting to Air Force aircraft but may indicate a need for the aircrew to contact a military weather facility. Crews will consider all SIGMETs valid for their aircraft until verified as not applicable with a military METRO service.

6.22. Fuel Conservation:

6.22.1. Conservation of fuel requires everyone's active participation. For every pound of excess fuel, 3 percent of the excess will be burned each hour. Do not carry extra fuel for convenience. Unidentified extra fuel should not exceed Required Ramp Fuel Load (RRFL) by more than 5,000 pounds.

6.22.2. Planning guidelines for fuel conservation:

6.22.2.1. Use optimized CFPs whenever possible.

6.22.2.2. Limit the use of the APU when not necessary.

6.22.2.3. Delay engine start (normal engine start is 30 minutes prior to takeoff).

6.22.2.4. Cruise CG should be aft if practical.

6.22.2.5. Fly at optimum cruise altitude when practical.

6.22.2.6. Fly at optimum airspeeds.

6.22.2.7. Plan to do en route descents, when possible.

6.22.3. Fuel loads:

6.22.3.1. C-5 units may develop standard ramp loads.

6.22.3.2. De-fuel will not be required if RRFL is less than the standard ramp fuel load.

Section 6C—Pre-flight

6.23. AFTO Form 781, AFORMS Aircrew/Mission Flight Data Document. Review AFTO Form 781 before applying power to the aircraft or operating aircraft systems. The exceptional release must be signed before taxi. A maintenance officer, maintenance superintendent, or authorized civilian normally signs the exceptional release. If one of these individuals is not available, the aircraft commander may sign the exceptional release. Ensure that the DD Form 1896, **Jet Fuel Identaplate**, and AIR card is aboard the aircraft.

6.24. Aircraft Servicing and Ground Operations.

6.24.1. Aircraft Refueling. Aircrew members current in aircraft servicing may perform refueling duties when qualified maintenance support is not available and the mission would be delayed. Crewmembers may augment maintenance refueling teams at en route stops.

6.24.2. Concurrent Ground Operations. Concurrent ground operations (simultaneous refueling or defueling while maintenance or cargo operations are being performed) has a hazard potential. It will be accomplished in accordance with T.O. 00-25-172.

6.24.2.1. Two qualified personnel and an additional individual for scanner duties are required.

6.24.2.2. Movement into or within the safe area must be under control of the Chef Servicing Supervisor (CSS). Individuals must properly ground themselves before boarding the aircraft or handling fuel servicing equipment. Concurrent servicing, loading, and maintenance must be conducted according to T.O. 00-25-172 and current checklists, which will be reviewed before concurrent operations. Current checklist procedures take precedence over T.O. 00-25-172 procedures.

6.24.2.3. Simultaneous fuel and oxygen servicing is not authorized.

6.25. Aircraft Recovery Away from Main Operating Base (MOB). When an aircraft will land at a base other than the MOB, a crew chief should accompany the aircraft. The aircraft commander is responsible for ensuring the aircraft is turned to meet subsequent mission taskings. If qualified aircraft specialists are unavailable, the aircrew is responsible for turning the aircraft to meet subsequent mission taskings.

6.25.1. Recovery items the aircrew may be responsible for include, but are not limited to, the following:

6.25.1.1. Parking and receiving.

6.25.1.2. Aircraft servicing, including AGE usage.

6.25.1.3. Supervision of minor maintenance within local capability.

6.25.1.4. Minor configuration changes to meet mission tasking.

6.25.1.5. Securing the aircraft prior to entering crew rest.

6.25.1.6. Coordinating aircraft security requirements.

6.25.1.7. AFTO 781-series forms maintenance.

6.25.2. In all cases where aircrews turn aircraft without qualified maintenance specialist assistance, comply with the appropriate maintenance tech order.

6.25.3. Aircrews are not qualified to accomplish the required ground inspections. In those instances

where maintenance personnel are not available, the aircrew will enter a red dash symbol in the AFTO Form 781H, **Aerospace Vehicle Flight Status and Maintenance Document**, updating current status and enter a red dash symbol and a discrepancy that reflects that the applicable maintenance inspection (i.e. pre-flight, thru-flight, basic post-flight) is overdue.

6.26. Oxygen Requirements. The minimum quantity of oxygen aboard an aircraft before takeoff must be sufficient to accomplish the planned flight from the equal time point (ETP) to recovery should oxygen be required. Calculate using the 100 percent oxygen chart in the flight manual.

6.26.1. All aircrews shall comply with AFI 11-202V3, Table 6.1. When movement about the aircraft is necessary for relief, crew duties, etc., comply with the "cabin/cargo area crew" column. An authorized walk-around bottle satisfies the requirement.

6.26.2. Crewmembers occupying a crew station will have an oxygen mask readily available for use prior to engine start until engine shutdown.

6.26.3. ACs should conduct a rapid decompression drill during the first suitable segment of each airlift mission. In addition to donning oxygen masks, each crew position should review procedures to be accomplished in the event of an actual rapid decompression.

6.27. Fleet Service Equipment. Ensure required fleet service items are aboard. Fleet service items must be aboard the aircraft early enough to permit inventory 1 hour before takeoff time.

6.28. Cargo Documentation. Proper cargo documentation must accompany each cargo load. A cargo manifest is required prior to all departures with cargo aboard. If a computerized cargo manifest is not available at the manifesting station, a cargo listing will accompany the load. The cargo/mail listing may be an abbreviated manifest, but will contain all required MILSTAMP data and 463L pallet information for weight and balance purposes. A Shipper’s Declaration for Dangerous Goods is required for hazardous cargo. DD Form 1387-2, **Special Handling Data/Certification**, is required for sensitive/classified/signature service cargo.

6.29. Procedures for Airlifting Hazardous Cargo.

6.29.1. The term "hazardous cargo" as used in conjunction with airlift operations applies to the following classes and types of materials covered by AFJMAN 24-204:

6.29.1.1. Class 1 (Explosives).

6.29.1.2. Class 2 (Compressed gas).

6.29.1.3. Class 3 (Flammable liquid).

6.29.1.4. Class 4 (Flammable solid).

6.29.1.5. Class 5 (Oxidizer and organic peroxide).

6.29.1.6. Class 6 (Poison and infectious substances).

6.29.1.7. Class 7 (Radioactive material).

6.29.1.8. Class 8 (Corrosive material).

6.29.1.9. Class 9 (Miscellaneous dangerous goods).

6.29.2. Procedures in this paragraph apply when aircraft carry any quantity of the following materials:

6.29.2.1. DoD class or division 1.1, 1.2, 1.3 (Explosives).

6.29.2.2. Class or division 2.3 (Poison gas)

6.29.2.3. Class or division 6.1, (Poison) PG I, zone A and B

6.29.2.4. Class 7 (Radioactive yellow III label.)

6.29.2.5. Class 4.3 (Dangerous when wet).

6.29.2.6. Nuclear weapons, nuclear components, inert devices.

6.29.2.7. DoD hazard class or division 1.4 explosives that transit the United Kingdom, Italy, or Hawaii.

6.29.3. Procedures apply to nuclear cargo, toxic chemical ammunition, highly toxic substances, hazard division 1.1 through 1.3 explosives, and infectious substances (including biological and etiological materials). In addition it applies to Class 7 (Radioactive materials) which require a yellow III label, and all other hazard classes or divisions, (except class 9 and other regulated material (ORM-D)) when shipped in quantities of 1,000 pounds (455 kgs) or more aggregate gross weight.

6.29.4. The following procedures are established to satisfy the reporting requirements of AFJI 11-204, *Operational Procedures for Aircraft Carrying Hazardous Materials*. For nuclear weapons, nuclear components, and inert devices see AFI 11-299, *Nuclear Airlift Operations*:

NOTE:

Quantities not covered in paragraph **6.29.2** and paragraph **6.29.3** are exempt from these procedures.

6.29.4.1. The aircraft commander will be briefed on the following information concerning hazardous materials placed aboard the aircraft:

6.29.4.1.1. Proper shipping name (PSN).

6.29.4.1.2. Hazard class.

6.29.4.1.3. Identification numbers.

6.29.4.1.4. The total quantity of hazardous cargo in gross weight or volume (except for class 9, ORM-D, and consumer commodities).

6.29.4.1.5. The location of hazardous item(s) in the aircraft.

6.29.4.1.6. DoD class or division when any type explosives are involved.

6.29.4.1.7. Net explosives weight (NEW) for all explosives aboard the aircraft.

6.29.4.1.8. The requirement for escorts, couriers and protective equipment.

6.29.4.1.9. The number of passengers permitted aboard the aircraft.

6.29.4.1.10. The procedures to use in an emergency.

6.29.4.1.11. All cargo being carried under the terms of a DOT exemption, a DoD certification of equivalency (COE), a CAA, or a waiver.

6.29.4.1.12. Written notification indicating "Prior Permission Required" (PPR), obtained from the next base to be transited.

6.29.4.1.13. Smoking restrictions.

6.29.4.1.14. Flight plan annotation requirements.

6.29.4.1.15. Isolated parking and taxiing requirements.

6.29.4.1.16. Security classification, if appropriate.

6.29.4.1.17. Notification of the requirement to contact the next base to be transited at least 30 minutes prior to landing. (Such contact is not required for quantities other than those in paragraphs **6.29.2** and **6.29.3**)

6.29.4.1.18. Placard requirements.

6.29.4.1.19. Other special handling requirements.

6.29.4.2. Cargo documentation. The loadmaster will ensure proper documentation, certification and identification of cargo is furnished. AFJMAN 24-204 contains detailed instructions on packaging, marking, labeling, and certification requirements associated with the airlift of hazardous materials.

6.29.4.3. Flight Planning. When briefed according to paragraph **6.29.4.1**, the aircraft commander will:

6.29.4.3.1. Enter "Hazardous Cargo" and the mission identifier or flight number in the appropriate section of the flight plan. Refer to FCG for country specific requirements concerning over-flight when transporting HAZMAT. (Use remarks section of DD Form 175, or other information section of DD Form 1801.)

6.29.4.3.2. If possible, plan the flight to minimize over-flying heavily populated or otherwise critical areas. Approach, landing, and takeoff tracks are excluded.

6.29.4.3.3. Prepare a departure message at stations when a command and control center (CCC) is not available. The remarks section of the departure message should include the following information:

6.29.4.3.3.1. Class of hazardous material aboard and the DoD class or division for explosives and NEW. Include the gross weight for the materials in paragraph **6.29.3**.

6.29.4.3.3.2. Request for special handling; for example, isolated parking, security, technical escort teams, etc.

6.29.4.3.4. If estimated time en route (ETE) is less than 1 hour, or if other circumstances preclude timely message receipt at destination, notify the base of first intended landing by priority telephone of the ETA and information listed in paragraph **6.29.4.3.3**. Ask the CCC at the departure base to relay this information to base operations at the point of first intended landing when a CCC is available.

6.29.4.4. Before engine start. Remove placards, when used, from the aircraft. Give the controlling agency parking location, approximate engine start time, and verify the fire fighting agency has the hazardous materials information; otherwise, request the following be relayed to the fire fighting agency:

6.29.4.4.1. Class of hazardous material aboard and the DoD class or division for explosive materials aboard.

6.29.4.4.2. NEW for DoD class or division 1.1, 1.2, and 1.3 explosives.

6.29.4.4.3. Estimated time of departure.

6.29.4.5. En route. Normal procedures apply. Comply with paragraph **6.29.4.3.2**.

6.29.4.6. Before landing. Unless specifically prohibited by the theater commander, FCG, or FLIP planning, contact the agency specified in FLIP, base operations dispatcher, control tower or approach control at least 30 minutes (or as soon as practical) before ETA to announce that "hazardous materials" are aboard and to verify that the hazardous cargo message has been received. Transmit the mission number, ETA, and information in paragraph **6.29.4.3.3**. Request the information be relayed immediately to base operations or the civil airport manager, crash and fire protection agency, and other support activities. If landing at a CONUS civil airport without a tower, give the above information to the nearest FAA flight service station.

6.29.4.7. DoD requires aircraft carrying DoD class or division 1.1, 1.2, and 1.3 explosives, hazardous class or division 2.3 or 6.1 PG I zone A or B materials, and munitions to be parked in areas isolated from non-associated personnel and facilities. When such cargo is aboard, aircraft commanders are responsible for ensuring cargo is correctly identified to the tower or ground control. When aircraft are not directed to an isolated area, identify the cargo again to tower or ground control. When identification is acknowledged, the host is solely responsible for selecting the parking area. Should host procedures be questionable, submit trip reports or hazard reports, as appropriate, to document such occurrences.

6.29.4.8. The military host is responsible for placarding aircraft. When missions operate on non-military bases, the briefing to the aircraft commander will include placarding requirements and, if required, placards will be furnished at the onload base. The shipper and receiver must make prior arrangements with the airport manager for shipments of hazardous materials requiring placarding. The shipper and receiver are responsible for cargo identification, fire fighting procedures, and isolated parking requirements.

6.29.4.9. Unscheduled Landing Due to In-flight Emergency. Transmit unclassified information to the appropriate ATC facility as follows:

6.29.4.9.1. Nature of emergency and intent to land.

6.29.4.9.2. Aircraft position and ETA.

6.29.4.9.3. Number of personnel and location in aircraft.

6.29.4.9.4. Fuel on board.

6.29.4.9.5. Hazardous materials aboard, location of the cargo, and applicable information listed in paragraph

6.29.4.10. After Unscheduled Landing. Contact the TACC by telephone, HF radio, or message, giving arrival notice, hazardous materials information, and other pertinent information, as required.

6.30. Handling of Classified Cargo, Registered Mail, NMCS/VVIP/FSS Shipments, and Courier Material.

6.30.1 Receipts will be obtained for classified cargo, NMCS/VVIP/FSS shipments, and registered mail at the on-load and off-load station using the cargo manifest.

6.30.1.1. Defense Courier Service (DCS) couriers coordinating with the aircraft commander are authorized to designate officer or enlisted, (E-5 and above) crewmembers on military aircraft as couriers to escort and safeguard courier material when other qualified personnel are not available. Qualified passengers, if carried, are designated prior to designating crewmembers. The following restrictions apply:

6.30.1.1.1. Primary crewmembers will not be designated without the consent of the aircraft commander.

6.30.1.1.2. Crewmembers on aircraft scheduled to stop at locations where DCS couriers cannot provide en route support will not be designated as couriers. This does not relieve the aircraft commander of the responsibility for life and death urgent shipments.

6.30.2. During stops at en route locations supported by DCS stations, DCS couriers are required to meet designated couriers to protect the material.

6.30.2.1. During unscheduled stops, crewmembers may place courier material in temporary custody of the following agencies listed in descending order of priority:

6.30.2.1.1. DCS courier.

6.30.2.1.2. TOP SECRET control officer of the US armed forces.

6.30.2.1.3. US Department of State diplomatic courier.

6.30.2.1.4. US Department of State activity.

6.30.2.1.5. US military guards.

6.30.2.1.6. US DOD civilian guards.

6.30.3. If unable to follow the itinerary to the destination of the courier material, or if material is lost, stolen, or otherwise compromised, report circumstances to the nearest armed forces courier station and notify the local US military commander or US government activity.

Section 6D—Departure

6.31. On Time Takeoffs. Mission departures are on time if the aircraft is airborne within -20/+14 minutes of scheduled takeoff time.

6.31.1. A/R and Tactical Missions. Scheduled takeoff time may be adjusted to make the air refueling control time (ARCT), time over target (TOT), or time of arrival (TOA). Notify controlling agency prior to takeoff to adjust the scheduled takeoff time.

6.31.2. Early Departures:

6.31.2.1. Home Station. Early departures are authorized to prevent a delay due to weather, ATC restrictions, airfield or aircraft operational limitations, to adjust mission flow during a large scale operation, or if approved through CCC.

6.31.2.2. En route Stations. Early departures at en route stations may be authorized through CCC, provided the impact on local and downrange facilities and crew duty is evaluated.

6.32. Weather Minimums For Takeoff.

Mission	Visibility	Remarks
Operational	RVR 1000	When less than RVR 1600, but equal to or greater than RVR 1000, the crew may take off provided the runway has dual RVR readouts and displays (minimum RVR 1000 on both) and runway centerline lighting is operational. For any takeoff below 1600 RVR, the crew must be fully qualified.
All others	RVR 1600	For runways with more than one operating RVR readout, RVR must read 1600 minimum on all.

NOTE:

When weather is below approach and landing minimums (ceiling or visibility) a takeoff alternate is required (See paragraph **6.19**).

Section 6E—En route

6.33. Flight Progress:

6.33.1. Prior to flight, plot the oceanic portion of the flight on an appropriate chart. Annotate the chart with the mission number, aircraft commander's name, preparer's name, and date. If practical, chart may be reused.

6.33.2. Anytime waypoint data is inserted into the INS/FMS, it will be verified by another primary crewmember. Check both the coordinate information and the distances between waypoints against the flight plan. Use the following procedures for monitoring flight progress:

6.33.2.1. When possible, obtain a coast-out fix prior to or immediately upon entering a category I route segment. Plot the fix on the chart using the procedures in **Chapter 11**.

6.33.2.2. When approaching each waypoint, recheck coordinates for the next waypoint.

6.33.2.3. Approximately 10 minutes after passing each oceanic waypoint, record and plot the INS triple mix position (steering solution position for airplanes modified with FMS/GPS), GPS position (N/A for airplanes modified with FMS/GPS), and time on the chart, and ensure compliance with course and ETA tolerances.

6.33.2.4. If revised clearance is received, record and plot the new route of flight on the chart.

6.33.3. On return to home station, turn in the applicable items: charts, fuel planning calculations, and CFPs. Squadrons will maintain them for a minimum of 90 days as part of the flight records.

6.33.4. Should one or more INSs become inoperative over a category I route/overwater segment, refer to inoperative inertial navigation units in paragraph **11.4.2**.

6.33.5. Maintain a range control chart or fuel management log for all category I route/overwater missions and for all missions where the flight profile differs from that on which fuel planning was based. Monitor the required begin descent fuel on each leg. If the actual fuel consumption trend will not allow for the required begin descent fuel, either land short for additional fuel or adjust required begin descent fuel (change cruise altitude/mach and/or alternates, weather permitting). Declare minimum fuel IAW AFI 11-202V3, if fuel consumption will not allow the aircraft to begin descent with the required begin descent fuel. Declare emergency fuel if, in the opinion of the aircraft commander, landing traffic priority is required.

6.33.6. Operations in International/Territorial Airspace. (See FLIP, FCG, and AP for further guidance) US military aircraft and DoD personnel entering another nation to conduct US government business therein must have the approval of the foreign government concerned to enter their airspace. Foreign clearances for US international air operations are obtained through US officials known as Defense Attaché Officers (DAOs). Refer to FLIP GP for discussion of international strait passage, archipelagic sea lane passage, procedures to follow if intercepted, and other foreign sovereignty issues.

6.33.6.1. There are essentially two types of airspace: international airspace and territorial airspace. International airspace includes all airspace seaward of coastal states' territorial seas. Military aircraft operate in such areas free of interference or control by the coastal state. Territorial airspace includes airspace above territorial seas, archipelagic waters, inland waters, and land territory and is sovereign airspace. Overflight may be conducted in such areas only with the consent of the sovereign country.

6.33.6.2. Consistent with international law, the US recognizes sea claims up to 12 nautical miles. Diplomatic constraints and/or a lack of diplomatic clearances usually result in missions operating in international airspace. Because of this, it is imperative sufficient information be provided far enough in advance to allow compliance with FCG requirements established by the countries concerned. The US does not normally recognize territorial claims beyond 12 nautical miles; however, specific guidance from certain US authorities may establish limits which differ from the standard.

6.33.6.3. Flight Information Region (FIR). An FIR is defined as an area of airspace within which flight information and related services are provided. An FIR does not reflect international borders or sovereign airspace. Aircraft may operate within an established FIR without approval of the adjacent country, provided the aircraft commander avoids flight in sovereign airspace.

6.33.6.4. Aircrews on a flight plan route which takes them from international airspace into territorial airspace for which approved aircraft clearances were obtained should not amend entry point(s).

6.33.6.5. Violations of foreign sovereignty result from unauthorized or improper entry or departure of aircraft. Aircrews should not enter into territorial airspace for which a clearance has not been duly requested and granted through diplomatic channels.

6.33.6.6. Air traffic control agencies are not vested with authority to grant diplomatic clearances for penetration of sovereign airspace where prior clearance is required from the respective country. Aircraft clearances are obtained through diplomatic channels only.

6.33.6.7. In the event air traffic control agencies challenge the validity of a flight routing or attempt to negate existing clearances, pilots must evaluate the circumstances. The normal response will be to attempt to advise the air traffic control agency that the aircraft will continue to planned destination as cleared in international airspace. The key phrase is "in international airspace." Safety of flight is paramount in determining mission continuation. Under no circumstances should aircrews construe a clearance which routes their mission over sovereign airspace which was not approved through diplomatic channels prior to mission departure as being valid authorization.

6.33.6.8. Aircrews operating missions requiring unique or specially developed routing will normally be briefed at home station, onload station, and/or by the last C2 facility transited prior to performing the critical portion of the mission.

6.33.6.9. Aircrews (except on weather reconnaissance missions) normally are not tasked to and should not fly "due regard" routing unless specifically directed in the mission frag or coordinated with proper authorities through TACC or AMOCC. The "due regard" or "operational" option obligates

the military aircraft commander to be their own air traffic control agency and separate their aircraft from all other air traffic. If operational requirements dictate, ACs may exercise the "due regard" option to protect their aircraft. When the threat has terminated, the aircraft will return to normal Air Traffic Services. Refer to FLIP GP for guidance on due regard.

6.34. Navigational Aid Capability:

6.34.1. North Atlantic minimum navigation performance specification (MNPS) airspace and US West Coast and Hawaii route system procedures are as follows:

6.34.1.1. Minimum navigation performance specifications standards (FLIP AP/2) are mandatory.

6.34.1.2. Aircraft that lose one INS prior to airspace entry may continue.

6.34.1.3. Aircraft that lose more than one INS prior to airspace entry will return to the nearest maintenance repair facility.

NOTE:

With one INS inoperative, advise ATC unless within range of normal radio aids. Check the accuracy of remaining INS using all available navigation aids.

6.34.2. Reduced Vertical Separation Minimum (RVSM) Airspace. Airspace where RVSM is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. The C-5 is approved for unrestricted use in the full RVSM envelope. Refer to FLIP AP/2 and the following for RVSM requirements:

6.34.2.1. Both primary altimeters, at least one autopilot, the altitude advisory system, and the transponder must be fully operational prior to entry into RVSM airspace. Should any of this equipment fail prior to entering RVSM airspace, request a new clearance so as to avoid this airspace.

6.34.2.2. The autopilot should be engaged during level cruise, except when circumstances such as the need to re-trim the aircraft or turbulence require disengagement.

6.34.2.3. Crosscheck the altimeters prior to or immediately upon coast out. Record readings of both altimeters and retain for use in contingency situations.

6.34.2.4. Continuously crosscheck the primary altimeters to ensure they agree ± 200 ft.

6.34.2.5. Aircrews should limit climb and descent rates to 1,000-feet per minute when operating in the vicinity of other aircraft to reduce potential effects on TCAS operations.

6.34.2.6. Should any of the required equipment fail after entry into RVSM airspace, immediately notify ATC and coordinate a plan of action.

6.34.2.7. Document (in the aircraft forms) malfunctions or failures of RVSM required equipment, including the failure of this equipment to meet RVSM tolerances.

6.34.3. Required Navigation Performance (RNP) Airspace. Airspace where RNP is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. RNP airspace is being incorporated around the world to increase air traffic capacity by decreasing separation requirements between routes. The C-5 is approved for operation in RNP airspace, but operational time may be limited based on navigation equipment.

6.34.3.1. RNP-10. Compliance includes navigation accuracy within 10NM of actual position 95% of the time. Aircraft possessing integrated GPS with receiver autonomous integrity monitoring (RAIM) may operate in RNP-10 airspace without time limitations. Note: if the capability to update the integrated navigation solution with GPS is lost, or if RAIM is lost, the aircraft is limited to 5.9 hours of operation in RNP-10 airspace after the GPS or RAIM is degraded. Aircraft not possessing integrated GPS with RAIM may operate up to 6.2 hours (after entering nav mode) in RNP-10 airspace without a TACAN update. If an automatic update (TACAN mix) is made, the aircraft may continue for an additional 5.7 hours after update is complete. The following are RNP-10 requirements:

6.34.3.1.1. Until all C-5 aircraft receive integrated GPS, NOPAC routes will require TACAN updates to be RNP-10 compliant. Shemya TACAN must be operational. A position crosscheck will be made when abeam Shemya. If inertial position is more than 3 NM from TACAN fix position, a TACAN update must be accomplished on all inertial units exceeding this limit.

6.34.3.1.2. Flight Planning. The pilot in command will verify the aircraft is approved for RNP operation, assess mission impact when flying in RNP-10 airspace, and verify the letter "R" is annotated in block 10 of the DD Form 1801, **International Flight Plan**.

6.34.3.1.3. En Route. At least two long range navigation systems certified for RNP-10 must be operational at the oceanic entry point. Periodic crosschecks will be accomplished to identify navigation errors and prevent inadvertent deviation from ATC cleared routes. Advise ATC of the deterioration or failure of navigation equipment below navigation performance requirements and coordinate appropriate actions.

6.34.3.1.4. Document (in the aircraft forms) malfunctions or failures of RNP required equipment, including the failure of this equipment to meet RNP tolerances.

6.34.4. Basic Area Navigation (BRNAV) Airspace. Airspace where BRNAV is applied is considered special qualification airspace. Both the operator and the specific aircraft type must be approved for operations in these areas. BRNAV navigation accuracy criteria is RNP-5. The C-5 is approved for BRNAV operations. Aircraft with integrated GPS have no BRNAV restrictions. Without integrated GPS, aircraft must TACAN update every two hours to maintain actual centerline within +/- 5 NM of ATC cleared route.

6.34.4.1. Minimum equipment to operate in BRNAV airspace is one INS capable of updates or an approved GPS with RAIM. Flights entering BRNAV airspace after long overwater flight must be especially aware of BRNAV tolerances and update accordingly.

6.34.4.2. Aircraft unable to maintain BRNAV tolerances must advise ATC immediately and take appropriate coordinated action.

6.34.4.3. Document (in the aircraft forms) malfunctions or failures of BRNAV required equipment, including the failure of this equipment to meet BRNAV tolerances.

6.35. CIRVIS and Other Reports. Report all vital intelligence sightings from aircraft as indicated in FLIP planning or FLIP En route Supplement.

6.35.1. In-flight harassment or hostile action against C-5 aircraft. Aircraft subjected to harassment or hostile action by foreign aircraft will immediately contact the nearest US Air Force air and ground voice facility and report the encounter. Include aircraft nationality, type, insignia, or any other identifying features; note position, heading, time, speed when harassed, and the type of harassment. Request relay

of the report to the nearest CCC. Also attempt to contact the nearest command post when in UHF and VHF range.

6.35.2. Other incidents will be reported as indicated in JCS Pub 6, volume V, and AFMAN 10-206, *Operational Reporting.*

6.36. In-flight Meals. The AC and the pilot should not eat meals at the same time, and their meals should consist of different menu items.

6.37. Communications:

6.37.1. HF Communications. Confine message traffic to essential operational matters. Perform an HF radio ground check prior to takeoff when the use of HF radio may be required for ATC or C2 communications. Establish HF contact before going out of UHF and VHF range.

6.37.2. General. Provide ARTCC position and weather observations when required. If unable to contact an ATC agency, attempt relay through the GLOBAL HF stations.

6.37.3. **AF Form 72, Air Report (AIREP).** When directed by departing weather facility, take and record an AIREP at each position report over a Category I Route. Identify inaccurate CFP winds by special report if the average wind for a route segment exceeds either 30 degrees error in wind direction or 25 knots in wind speed. Turn in completed AF Form 72 to the destination USAF weather facility.

6.38. In-flight Emergency Procedures. Report deviations from directives that may occur as a result of an emergency in accordance with AFI 11-202V3, and this AFI (see paragraph **1.4**.).

6.38.1. Notification of Controlling Agencies. When practical after completing the aircraft emergency action checklists and associated actions, crews should furnish the controlling agency and appropriate CCC with a description of the difficulty, assistance required, intentions, and any other pertinent information.

6.38.2. A CONFERENCE SKYHOOK may be initiated when additional expertise is necessary to cope with emergencies or other conditions. Communications procedures are as follow:

6.38.2.1. Local Area. When in UHF or VHF range, initiate the conference over appropriate frequencies.

6.38.2.2. En route. When out of UHF range, use HF radios to establish a phone patch with the nearest or controlling C2 center as appropriate.

6.38.2.3. Provide the following information when time permits.

6.38.2.3.1. Narrative description of the situation to include actions taken by the crew and the intentions of the aircraft commander.

6.38.2.3.2. Fuel on board and hours of endurance.

6.38.2.3.3. Position.

6.38.2.3.4. Altitude and flight conditions.

6.38.2.3.5. Number of personnel and distinguished visitors (DV) on board.

6.38.2.3.6. Qualification of aircraft commander.

6.38.2.3.7. Planned landing base.

6.38.2.3.8. ETA at landing base.

6.39. Need for Medical Assistance. When a person aboard the aircraft requires medical care, inform the station of intended landing in sufficient time so the aircraft may be met by medical personnel. Include the sex, approximate age, and the major complaint in the request.

6.40. Weather Forecasts:

6.40.1. It is the pilot's responsibility to obtain destination weather prior to descent.

6.40.2. The primary means is any US Air Force base weather station via pilot-to-meteorologist service (PMSV) or through a US Air Force aeronautical station.

6.40.3. For aircraft flying in EUCOM AOR (ENAME operations) contact USAFE/OWS at Sembach AB GE (DSN 314-496-6145). SOUTHCOM AOR contact 25 OWS at Davis-Monthan AFB, AZ (DSN 228-1977).

6.40.4. The ATC system can provide weather information to en route aircraft.

6.40.4.1. The ARTCCs have a limited capability to provide weather information to en route aircraft within CONUS.

6.40.4.2. SIGMET (significant meteorological information) advisories will be transmitted from the servicing ATC unit. Crews will consider all SIGMETs valid for their aircraft until verified as not applicable with a military METRO service.

6.40.5. Flight Service Stations may be able to assist.

Section 6F—Arrival

6.41. Descent. Prior to descent into unfamiliar areas, appropriate terrain charts (Operational Navigation Chart (ONC), Sectional Aeronautical Chart, Tactical Pilotage Chart (TPC), or Joint Operations Graphic (JOG)) should be reviewed to increase aircrew situational awareness of obstructions. Primary crewmembers will not be involved in duties other than aircraft operations, descent and approach monitoring, and required checklist items from the initial descent point to landing.

6.41.1. Night and Marginal Weather Operations. Fly a precision approach, if available, at night or during marginal weather. If a precision approach is not available, fly any available approved instrument approach. During night VFR conditions, if an approved instrument approach is not available, a visual approach may be flown (only if a visual glide slope indicator [VASI, PAPI, etc.] is available). On training and evaluation flights at familiar fields, pilots may fly non-precision approaches or VFR traffic patterns to accomplish required training and evaluations. The pilot not flying the approach will monitor a precision approach when practical to enhance safety.

6.42. Instrument Approach Procedures:

6.42.1. Instrument approach RVR/visibility and, if required, ceiling minimums will be as published for a category D aircraft. Prior to starting an instrument approach or beginning an en route descent, pilots will confirm that existing weather is reported to be:

6.42.1.1. At or above required visibility for a DoD or NOAA precision approach.

6.42.1.2. At or above required ceiling and visibility for all other approaches. For approaches with no published ceiling requirement (for example Jeppesen approaches), the minimum required ceiling shall be computed by taking the published HAA or HAT and rounding it up to the nearest one hundred feet

or as determined by MAJCOM TERPS review. For example, a Jeppesen VOR approach with a published HAA of 642-feet would require an existing ceiling of 700-feet (plus the published visibility) prior to commencing the approach or en route descent.

NOTE:

Pilots shall increase the published visibility minimums of an instrument approach by ½ SM or as noted in NOTAMs, on ATIS, or on the approach plate, when the runway approach lighting system (ALS) is inoperative. (This applies only to the ALS itself, not to VASIs, PAPIs, and other lights that are not a component of the ALS.)

6.42.2. Prior to starting an instrument approach, pilots will confirm their aircraft can meet or exceed all climb gradients specified in the missed approach procedure, based on the number of engines operating when the approach is begun. If missed approach climb charts are not available, use the takeoff obstacle clearance charts. If unable to meet required climb gradients, pilots must coordinate alternate missed approach procedures with ATC which will ensure terrain clearance, prior to commencing the approach. If this is not possible, do not attempt the approach.

6.42.3. If ceiling is below value depicted for published DoD or NOAA precision approach but visibility is at or above authorized minimums, the pilot will comply with fuel requirements of **Chapter 14**, prior to initiating en route descent, penetration, or approach.

6.42.4. For a precision approach, the decision height will provide a height above touchdown of 200 ft or higher. For category (CAT) II ILS approaches, use the lowest published radar altitude, but no lower than 100-feet HAT. For PAR approaches, visibility will be no lower than RVR 2400 (730 meters) or 1/2 mile visibility (800 meters) with no RVR readout available.

6.42.5. Circling Approach. If not published by category, minimum ceiling and visibility will be as published, but in no case lower than 600-feet above published field elevation and 2 miles visibility.

6.42.6. Established on a Segment of the Approach. If established on a segment of the approach or being radar vectored to final approach and the weather is reported or observed to be below approach minimums, the aircraft commander has the option of continuing the approach to the MAP/DH. If deciding to abandon the approach, level off (or descend if a lower altitude is required for the missed approach procedure). Comply with the last assigned clearance until a new or amended clearance is received.

6.42.6.1. Do not continue the approach below minimums unless the aircraft is in a position to make a safe landing and the runway environment is in sight. CAT II approaches will not be continued if weather is reported below CAT II minimums.

6.42.6.2. If the approach is continued, aircraft commanders must plan to have sufficient fuel available to complete the approach and missed approach and proceed to a suitable alternate with normal fuel reserve.

6.42.6.3. The aircraft commander has final responsibility for determining when the destination is below designated minimums and for initiating proper clearance request.

6.42.7. An AC may hold at a destination that is below landing minimums, but forecast to improve to or above minimums provided:

6.42.7.1. Aircraft has more fuel remaining than that required to fly to the alternate and hold for the

appropriate holding time and weather at alternate is forecast to remain at or above alternate filing minimums for the period, including holding time.

6.42.7.2. Destination weather is forecast to be at or above minimums before excess fuel will be consumed.

6.42.8. CAT II Procedures. The autopilot and autoland sub-system, including both VHF NAV receivers and radar altimeters, must be operative. Since DH is based on RA, rather than barometric altitude, do not fly category II approaches that have no RA setting for DH. Minimum HAT is 100-feet; Minimum RVR requirement is 1200. Maximum crosswind limitation is 10 knots or as determined from the performance manual, whichever is lower. Crosswind of 15 knots may be used for training approaches (under VMC).

6.42.8.1. See AFMAN 11-230, *Instrument Procedures*, Chapter 3, and Attachment 3 for CAT II requirements. As a minimum, the following airfield equipment must be operational:

6.42.8.1.1. Approach lights.

6.42.8.1.2. Runway centerline lighting.

6.42.8.1.3. High intensity runway lights or touchdown zone lights.

6.42.8.1.4. Approach end transmissometer.

6.42.8.1.5. ILS far field monitor.

6.42.8.1.6. Sequenced flashers.

6.42.8.2. The following aircrew restrictions apply for category II approaches:

6.42.8.2.1. Both pilots must be category II qualified and current.

6.42.8.2.2. AC must have 100 hours in command.

6.42.8.2.3. AC must have logged at least three simulated category II approaches in the aircraft.

6.42.8.3. When an autoland or coupled approach is flown, assume manual control at or above published DH. Automatic touchdowns are prohibited. For category II approaches, do not assume manual control until the runway is in sight or a go-around is initiated.

6.42.9. Alternate flight publications. The following publications are authorized if acceptable DoD FLIP products are not available:

6.42.9.1. United State Department of Commerce National Oceanic and Atmospheric Administration (NOAA).

6.42.9.2. Jeppesen and Host Government Instrument Approach and Departure Procedures. May be used if MAJCOM approved IAW AFI 11-202V3. Crews will contact controlling agency to confirm MAJCOM approval prior to flying these approaches. If not MAJCOM approved, these approaches may not be used in IMC.

6.43. Classified Equipment and Material. Comply with the following or as directed in MAJCOM supplement.

6.43.1. Equipment. When classified equipment is onboard, ensure the CCC or base operations office is aware of the requirement for aircraft security according to **Chapter 7**. At bases not under jurisdiction

of the Air Force, ensure the aircraft and equipment are protected. AFI 31-401, *Managing the Information Security Program*, provides specific guidance concerning the security of various levels of classified equipment aboard aircraft.

6.43.1.1. IFF/SIF mode 1, 2, and 3/A codes, having once been set and transmitted, are unclassified and, therefore, may be left set in the transponder.

6.43.1.2. IFF/SIF mode 4 codes must always be zeroed before leaving the aircraft.

6.43.2. Material. Ensure Communications Security (COMSEC) and other classified materials are turned in at destination and receipts are obtained for COMSEC and classified material. The on-site C2 center will provide temporary storage for COMSEC and other classified materials during en route, turnaround, and crew rest stops. If a storage facility is not available, the aircraft gun storage box may be used for material classified up to and including SECRET. Encrypted COMSEC will only be transferred to authorized DoD personnel.

6.43.3. Aircrews will ensure that they have an operable mode 4 when required for mission accomplishment. Aircrews will conduct an operational ground test of the mode 4 (ground test assets permitting) prior to deployment overseas, or as specified in the OPORD or contingency/exercise tasking.

6.43.4. Attempt to fix an inoperable mode 4 prior to takeoff. Do not delay takeoff nor cancel a mission for an inoperable mode 4, except when the aircraft will transit an area where safe passage procedures are implemented (see **Chapter 4**).

6.43.5. Conduct an in-flight check of the mode 4 on all missions departing the CONUS for overseas locations. Aircrews can request the mode 4 interrogation check through NORAD on UHF frequency 364.2. Request interrogation test through the appropriate Sector Operations Control Center (SOCC):

CONUS Sector	Location	Call Sign
Northeast	Griffiss Airport	Huntress
Southeast	Tyndall AFB	Oak Grove
Southwest	March Field	Sierra Pete
Northwest	McChord AFB	Big Foot

6.43.6. Aircraft with inoperable mode 4 will continue to their intended destinations. Repairs will be accomplished at the first destination where equipment, parts, and maintenance technicians are available (see chapter 4). In theaters where safe passage is implemented, aircraft will follow procedures for inoperable mode 4 as directed in the applicable airspace control order or ATO.

6.43.7. Ground and in-flight checks of the mode 4, when conducted, are a mandatory maintenance debrief items. Crews will annotate successful and unsuccessful interrogation of the mode 4 on all aircraft forms (AFTO Form 781A).

6.43.8. Aircrews will carry COMSEC equipment and documents required to operate the mode 4 on missions when required (see paragraph **6.43.3**). Prior to departing for any destination without COMSEC storage facilities, crews will contact their local COMSEC managers for guidance.

6.44. Unscheduled Landings. When an unscheduled landing or crew rest occurs at a base without a passenger facility, the aircraft commander should immediately advise the appropriate CCC and request assistance in arranging substitute airlift for passengers that are aboard. The following procedures apply when obtaining support for service members, in a group travel status, who are transported on organic

aircraft flying a TWCF mission which incur an unscheduled delay due to weather or maintenance problems, forcing the members to be lodged at that location until the aircraft can continue its mission.

6.44.1. If the delay is at a location where DoD facilities and AMC TWCF funds are available, payment for lodging (contract or on-base) will be made by the local accounting liaison/OPLOC citing TWCF funds. The appropriate TWCF funds cite may be obtained from the local financial analysis and/or accounting liaison office. Normally, a BPA contract or AF Form 616, **Fund Cite Authorization (FCA)**, is already established at these locations to charge the routine lodging costs for transient or TDY individuals who are on TWCF funded travel orders.

6.44.2. If the delay is at a location where DoD facilities are available and AMC TWCF funds are not available, the aircraft commander will utilize AF Form 15, **United States Air Force Invoice**, to acquire the appropriate lodging accommodations. Upon return to home station, the aircraft commander will turn in the AF Form 15 to the local accounting liaison office. A copy of the service members' group travel orders along with any other pertinent supporting data must accompany the form (e.g., lodging invoice and/or receipts). When the AF Form 15 has been validated, it will be forwarded on to the servicing OPLOC for payment, citing the funds of the unit whose aircraft was delayed.

6.44.3. If the delay is at a location where both DoD facilities and TWCF funds are unavailable, the aircraft commander will utilize AF Form 15 authority to acquire the appropriate meals, quarters, and transportation to support the service members. Upon return to home station, the aircraft commander will turn in the AF Form 15 to the local accounting liaison office. A copy of the service members' group travel orders along with any other pertinent supporting data must accompany the form (e.g., lodging invoice and/or receipts). When the AF Form 15 has been validated, it will be forwarded on to the servicing OPLOC for payment, citing the funds of the unit whose aircraft was delayed.

NOTE:

This policy does not apply to those passengers on delayed TWCF organic aircraft who are in a per diem or space available status except for those duty passengers on TWCF funded travel orders delayed at locations where TWCF funds are available.

6.45. Maintenance. Complete the AFTO Form 781 after each flight. After landing, crewmembers debrief maintenance personnel on the condition of the aircraft, engines, avionics equipment, and all installed special equipment as required. At stations without maintenance support, when a maintenance requirement exists the AC will ensure a thorough debrief is provided to the C2 agency, and the MAJCOM Logistics Readiness Center is notified prior to entering crew rest.

6.46. Border Clearance.

6.46.1. Normal Operations:

6.46.1.1. The unit dispatching the mission is normally responsible for the border clearance of all aircraft.

6.46.1.2. When staff support is not available, border clearance is the responsibility of the aircraft commander. Duties may be assigned to ground personnel or to the loadmaster, but the aircraft commander retains ultimate responsibility. When a C-5 aircraft is on-loaded at a base without an air traffic function, the aircraft commander is responsible for ensuring the following:

6.46.1.2.1. Crewmembers, troops, and passengers possess current passports and valid visas, when required.

6.46.1.2.2. Crewmembers, troops, and passengers have current certificates of immunization (shot record).

6.46.1.2.3. Cargo entry documents are in proper order.

6.46.1.2.4. Departing or entering the United States through an air base where border clearance can be obtained.

6.46.1.2.5. Obtaining border clearance for aircraft cargo, passengers, crew and baggage, if required, before takeoff to a foreign area or after arrival from a foreign area.

6.46.1.2.6. Spraying the aircraft (Foreign Clearance Guide and paragraph **6.47** of this chapter).

6.46.1.3. When arriving at stations located in foreign countries, comply with the following guidance:

6.46.1.3.1. Unless otherwise stated in the FCG, DO NOT open any doors other than the primary entrance to the aircraft (i.e., crew entrance door).

6.46.1.3.2. Do not offload passengers, troops, or crewmembers unless necessary for safety or the preservation of life and property (scanner or other crewmember with ground safety duties excepted).

6.46.1.3.3. Do not offload any cargo, mail, or bags until approved by the appropriate local authorities.

6.46.1.3.4. Be courteous with local officials.

6.46.2. Procedures for US Entry:

6.46.2.1. En route, the loadmaster will distribute personal customs declarations (when not accomplished by passenger services) to all passengers, troops, and crewmembers. The loadmaster will also brief passengers and crewmembers on customs regulations, and prepare and compile necessary border clearance forms for the aircraft commander's signature.

6.46.2.2. En route, notify the CC agency at the base of intended landing of any change in ETA to ensure that border clearance is accomplished as soon as possible after landing.

6.46.2.3. Obtain a permit to proceed when military necessities require that an aircraft (which has landed in the United States for customs clearance) proceed to another base in the US to obtain border clearance. The permit to proceed delays customs inspection of cargo, passengers, and crew until arrival at the off-load station and saves intermediate off-loading and reloading normally required for customs inspection. The permit to proceed is valid only to the airport of next landing where the border clearance must be completed or a new permit to proceed issued by a customs official. Do not make intermediate stops between the issue point of the permit to proceed and destination of manifested cargo unless required by an emergency situation or directed by the controlling CCC.

6.46.2.4. When an aircraft lands for a US border clearance, a US Customs representative normally will meet the aircraft to obtain the required documents. Do not deplane passengers, troops, or crewmembers unless necessary for safety or the preservation of life and property (scanner excepted). Do not unload until approved by customs and agriculture personnel or their designated representatives. This procedure applies to the initial landing in the US and all landings required when operating on a permit to proceed or until all crew, passengers, and cargo complete final border clearance.

6.46.2.5. If the aircraft lands for emergency or temporary reasons, the aircraft commander will ensure no cargo, baggage, personal property, or equipment is removed from the aircraft. Additionally, no passengers or crewmembers will depart the landing place unless removal or departure is necessary for safety or preservation of life and property.

6.46.3. Inspections of US aircraft by foreign officials:

6.46.3.1. AMC follows US Air Force policy on status of military aircraft as stated in the Foreign Clearance Guide, General Information, Chapter 3. In substance, this policy holds that US military aircraft are immune from searches, seizures, and inspections (including customs and safety inspections) by foreign officials. In addition, aircraft commanders must be aware of and adhere to any specific Foreign Clearance Guide provisions for individual countries.

6.46.3.2. If confronted with a search request by foreign authorities, aircrews should use the following procedures:

6.46.3.2.1. In most cases, search attempts may be halted simply by a statement of the aircraft commander to the foreign official that the aircraft is a sovereign instrumentality not subject to search without consent of US Air Force headquarters or the US Department of State officials in the country concerned. This should be clearly conveyed in a polite manner so as not to offend foreign authorities who may honestly, but mistakenly, believe they have authority to search US Air Force aircraft.

6.46.3.2.2. If foreign authorities insist on conducting a search, aircraft commanders should make every effort to delay the search until they can contact US Air Force headquarters (through AMC C2) or the appropriate embassy officials. The aircraft commander should then notify these agencies

of foreign request by the most expeditious means available and follow their instructions.

6.46.3.2.3. If foreign officials refuse to desist in their search request, pending notification to US Air Force headquarters or the appropriate embassy, aircraft commanders should indicate that they would prefer to fly the aircraft elsewhere (provided fuel, flying time, and mechanical considerations permit a safe flight) and request permission to do so.

6.46.3.2.4. If permission is refused and the foreign authorities insist on forcing their way on board an aircraft, the aircraft commander should state that he protests the course of action being pursued and that he intends to notify both US Air Force headquarters and the appropriate American embassy of the foreign action. The aircraft commander should not attempt physical resistance, and should thereafter report the incident to US Air Force headquarters and appropriate embassy as soon as possible. The aircraft commander should escort foreign authorities if the inspection cannot be avoided.

6.46.3.3. Other procedures may apply when carrying sensitive cargo or equipment. Follow these procedures and applicable portions of classified Foreign Clearance Guide supplements.

6.47. Insect and Pest Control.

6.47.1. Responsibility. Aircraft commanders will ensure required spraying is accomplished according to AFI 48-104, *Medical and Agricultural Foreign and Domestic Quarantine Regulations for Vessels, Aircraft, and Other Transports of the Armed Forces (Joint)*, Department of Defense Foreign Clearance Guide, or as directed by higher headquarters. Certify the spraying on CF 7507, or on forms provided by the country transited. Aircraft should never be sprayed with passengers on-board. The only exception is when the Foreign Clearance Guide mandates it.

6.47.1.1. When spraying is required, use insecticide, aerosol d-phenothrin-2 percent, National Stock Number (NSN) 6840-01-067-6674 (or equivalent), to spray the aircraft.

6.47.1.1.1. Direct the nozzle toward the ceiling of the compartment or space being sprayed.

6.47.1.1.2. Spray spaces inaccessible from within the aircraft after completely loading fuel, baggage, cargo, and passengers, including baggage compartments, wheel wells, and other similar spaces.

6.47.1.1.3. Spray the cabin, cockpit, and other spaces accessible from within the aircraft after the crew is aboard and after closing all doors, windows, hatches, and ventilation openings.

CAUTION: If the insecticide label directs disembarkation after use, spray prior to boarding crew or passengers. Close all doors and hatches for 10 minutes after dispensing and ventilate for 15 minutes before allowing anyone on board.

6.47.1.2. Duration if spray will be according to Figure **6.3** unless longer periods are specified for the country being transited.

Figure 6.4. Spray Chart.

Location	Seconds
Crew Compartment	42
Troop Compartment	50
Cargo Compartment	374
Underfloor Compartment	51

NOTE:

Keep used aerosol cans separate from other trash so they may be disposed of safely.

6.47.2. Responsibility of Aircraft Commander in Flight. When seeing any insect or rodent infestation of the aircraft in flight, notify the destination CCC, base operations, or airport manager of the situation before landing so the proper authorities can meet the aircraft.

6.47.3. Procedure at Aerial Port of Disembarkation (APOD). On arrival at an APOD, do not open cargo doors or hatches except to enplane officials required to inspect the aircraft for insect or rodent infestation or to deplane the minimum number of crewmembers required for block-in duties. Do not on-load or off-load cargo or passengers until the inspection is satisfactorily completed. This procedure may be altered to satisfy mission or local requirements, as arranged by the base air terminal manager or the local C2 organization.

Section 6G—Miscellaneous

6.48. Dropped Object Prevention. If an externally dropped object is discovered, the flight crew will:

6.48.1. Notify TACC or the controlling agency as soon as practical; include routing, altitude, weather, etc.

6.48.2. Notify maintenance at the first AMC station transited.

6.49. Cockpit Voice Recorder (CVR). If involved in a mishap or incident, after landing and terminating the emergency, open the CVR power circuit breaker.

6.50. Life Support and Dash 21 Equipment Documentation. The aircraft commander or designated representative will:

6.50.1. Prior to departing home station or en route stations, ensure appropriate serviceable protective clothing, life support, survival, and dash 21 equipment for the entire or remainder of the mission are aboard the aircraft.

6.50.2. Prior to departing home station and following en route crew changes, review AF Form 4076, **Aircraft Dash 21 Equipment Inventory,** to ensure all required dash 21 equipment has been certified as installed by maintenance, the initial check has been signed by maintenance, and configuration documents match mission requirements.

6.50.3. Prior to departing home station and following en route crew changes, review, sign, and date the AFTO Form 46, **Prepositioned Life Support Equipment**, to ensure all required protective clothing and life support and survival equipment have been certified as installed by aircrew life support and that configuration documents match mission requirements. Ensure appropriate number and type of life preservers are aboard for over-water missions carrying children and infants.

6.50.4. Missing Equipment. Aircrew members discovering equipment missing will accomplish the following:

6.50.4.1. Make an AFTO Form 781 entry for equipment found missing. Additionally, ensure equipment removed from the aircraft at an en route station is documented in the AFTO Form 781.

6.50.4.2. Annotate AF Form 4076 and AFTO Form 46 in the next vacant column indicating the quantity remaining for the item. Ensure the ICAO location designator is entered above the check number of that column. Leave AF Form 4076 and AFTO Form 46 on board the aircraft in the event of an en route crew change.

6.50.4.3. Advise the aircraft commander and determine whether the missing equipment should be recovered or replaced before mission continuation.

6.50.4.4. Assist, as required, in preparing reports of survey for missing equipment.

6.50.4.5. When possible, advise HQ AMC/DOTL and TACC (or airport management) before mission continuation.

6.50.5. Additional Equipment. If more equipment is discovered during the pre-flight than is annotated on the AF Form 4076 and AFTO Form 46, annotate the total quantity in the next vacant column for the item. Ensure the ICAO location designator is entered above the check number of that column.

6.50.6. In the event of an en route crew change, leave AF Form 4076 and AFTO Form 46 on the aircraft.

6.51. Passenger Restrictions:

6.51.1. The cargo compartment will not be used to airlift personnel, except with specific approval of MAJCOM/DO.

6.52. No-show Passenger Baggage. No-show passenger baggage or baggage of passengers removed from flight will be downloaded prior to departure.

6.53. Airfield Data Reports. Aircrews transiting strange airfields or airfields where conditions may adversely affect subsequent flight will:

6.53.1. Report airfield characteristics that produce illusions, such as runway length, width, slope, and lighting, as compared to standard runways, sloping approach terrain, runway contrast against surrounding terrain, haze, glare, etc.

6.53.2. Debrief the next CCC transited.

6.54. Impoundment of Aircraft. If an aircraft is involved in a serious in-flight incident, the aircraft commander should impound the aircraft immediately after landing and contact the controlling CCC for further instructions.

6.55. ***Not used.***

6.56. Billeting. For all en route arrivals, the AC will provide the appropriate CCC crew orders, so the CCC can notify the next RON location for billeting arrangements.

6.57 Distinguished Visitor (DV) Airlift:

6.57.1 This establishes aircrew responsibilities for transporting distinguished visitors (DV Code 6 and

above). DV travel may occur anywhere within the AMC system, and any crew may be tasked to carry DVs. They should be given special attention within the limits of available resources in a manner that reflects favorably on AMC.

6.57.1.1. All DVs code 6 and above (to include DV travel party) may be seated in the courier compartment (maximum of eight seats). The AC may invite the senior DV to occupy the observer seat during all phases of flight if the seat is not required for training or evaluation purposes.

6.57.1.2. Set aside the following areas for DV use:

6.57.1.2.1. Courier Compartment.

6.57.1.2.2. Aft Bunk Area. The bunk will be made up with sheets and blankets (request fleet service assistance). The forward bunk area should normally be used by aircrew personnel only.

6.57.1.3. No special meal service will be provided.

6.57.2. The primary crew will be in their seats with the Before Starting Engines Checklist completed prior to DV arrival at the aircraft. The crew should be prepared to start engines as soon as the DV is aboard the aircraft. The DV and party will be greeted at the aircraft by an officer designated by the AC. The greeting officer should assist the DV up the ladder and flight deck stairway to his or her seat. A crewmember will brief the DV, using the DV Briefing checklist (CL1).

Chapter 7

AIRCRAFT SECURITY

7.1. General. This chapter provides guidance on aircraft security and preventing and resisting aircraft piracy (hijacking) of C-5 aircraft. AFI 31-101V1, *Air Force Physical Security Program*, and specific MAJCOM security publications contain additional guidance. Aircrews will not release information concerning hijacking attempts or identify armed aircrew members or missions to the public.

7.2. Security. The C-5 is a priority "C" resource. Aircraft security at non-United States military installations is the responsibility of the controlling agency.

7.3. Air Force Physical Security Program. The following security procedures will implement AFI 31-101 requirements for C-5 aircraft:

7.3.1. The aircraft will be parked in an established restricted area and afforded protection via a roving patrol and a two-person armed response capability within 5 minutes.

7.3.2. When no permanent or established restricted area parking space is available, establish a temporary restricted area consisting of a raised rope barrier, and post with restricted area signs. Provide a one-person mobile patrol, supported by a two-person security response team capable of 5 minute response. Portable security lighting will be provided during the hours of darkness if sufficient permanent lighting is not available.

7.3.3. At non-United States military installations, the aircraft commander determines the adequacy of local security capabilities to provide aircraft security commensurate with this chapter. If the aircraft commander determines security to be inadequate, the aircraft will depart to a station where adequate security is available.

7.3.4. The security force must be made aware of all visits to the aircraft.

7.3.5. Security support is a continual requirement and is not negated by the presence of aircrew or ground crewmembers. Security force support terminates only after the aircraft doors are closed and the aircraft begins to taxi.

7.4. En Route Security. The planning agency must coordinate with the execution agency to ensure adequate en route security is available. Aircraft commanders will receive a threat assessment and en route security capability evaluation briefing for areas of intended operation prior to home station departure and should request updates from en route CCC as required. If required, a security team will be assigned to the mission.

7.4.1. PHOENIX RAVEN security teams (RST) support mobility operations by providing security protection for aircraft transiting locations where a high threat, host, or en route security support may be marginal, unreliable, or nonexistent. The RST will consist of two US Air Force security force members, but may include more depending on security requirements. The team travels in a special passenger status and is responsible to the aircraft commander at all times. A daily Threat Working Group (TWG) assesses security requirements for mobility missions and helps determine if a RST is required. When assigned PHOENIX RAVEN support, aircraft commander will:

7.4.1.1. Verify MAJCOM travel status on each RST’s travel orders. The RST reports directly to the aircraft commander, when assigned.

7.4.1.2. Be responsible for the RST’s welfare (transportation, lodging, etc.).

7.4.1.3. Ensure the RST receives an aircraft mission briefing and aircraft egress/passenger briefing as appropriate.

7.4.2. Arrival. The aircraft commander will assess the local situation and take the following actions as required:

7.4.2.1. Area patrol. Request area security patrols from local security forces. If local authorities request payment for this service, use AF Form 15.

7.4.2.2. Aircrew surveillance. During short ground times, direct armed crewmembers to remain with the aircraft and maintain surveillance of aircraft entrances and activities in the aircraft vicinity.

7.4.2.3. Inadequate security. If local security forces are unavailable or are unacceptable to the AC and the crew has not been augmented with a security team, the AC may waive the flight duty period limits and crew rest requirements and depart as soon as possible for a base considered reliable. Report movement and intentions to the controlling agency as soon as practical. If departure is not possible, the aircrew must secure the aircraft to the best of their ability. In no case, will the entire crew leave the aircraft unattended. Crew rest requirements will be subordinate to aircraft security when the airframe may be at risk. The aircraft commander should rotate a security detail among the crew to provide for both aircraft protection and crew rest until relief is available. Request security assistance from the nearest DoD installation, US Embassy, local military or law enforcement agencies as appropriate.

7.4.3. Entry Control Procedures. Unescorted entry is granted to aircrew members and support personnel assigned to the mission who possess their home station AF Form 1199A/B/C, **USAF Restricted Area Card**, supported by an entry access list (EAL) or aircrew orders. Aircrew members and assigned crew chiefs are authorized escort authority.

7.4.3.1. Normally, non-United States nationals such as cargo handlers can perform their duties under escort and should not be placed on the EAL.

7.4.3.2. Personnel not on the entry control list or aircrew orders must be escorted within the area.

7.5. Detecting Unauthorized Entry.

7.5.1. When parking on a secure ramp, the aircraft will normally be left unlocked/unsealed to allow ground personnel immediate access. If, in the aircraft commander's judgment, the aircraft needs to be locked and sealed in order to detect unauthorized entry, then:

7.5.1.1. Use available aircraft ground security locking devices.

7.5.1.2. Secure the doors in a manner that will indicate unauthorized entry (e.g. tape inside of doors to airframe so that entry pulls tape loose).

7.5.1.3. Close and lock the crew entrance door.

7.5.1.4. Wipe the immediate area around lock and latches clean to aid in investigation of a forced entry.

7.5.1.5. Report any unauthorized entry or tampering to the OSI, security police or local authorities, and the CCC agency. Have aircraft thoroughly inspected prior to flight.

7.5.2. Security awareness is crucial to effective mission accomplishment. Aircrews must always remain vigilant to their surroundings, especially at high threat, low security locations. During pre-flight activities,

aircrews will inspect accessible areas, to include aircraft wheel wells, flap pack area, aft empennage area, avionics compartments, and boiler room compartment of the aircraft for unauthorized packages, personnel, or other unfamiliar devices. Report any suspicious items to host security forces. Aircrews will maintain a heightened security posture throughout all pre-departure activities.

7.6. Preventing and Resisting Hijacking.

7.6.1. The Air Transportation Act of 1974 and the Federal Aviation Act of 1958, as amended, vest the FAA Administrator with exclusive responsibility for the direction of law enforcement activity in aircraft hijacking situations involving all aircraft (civil and military) in flight in the United States.

7.6.2. In taking action during an aircraft hijacking situation, military forces will act under military command within the scope of their duties.

7.6.3. In the event an aircraft involved in an aircraft hijacking situation is carrying documents, equipment, or material that DoD has determined to be highly sensitive, or weapons of mass destruction, DoD will provide FAA, and where appropriate, the FBI, with all pertinent information. Where possible, the FAA will consult and cooperate with DoD prior to directing any law enforcement activity.

7.6.4. An aircraft is most vulnerable to hijacking when the aircrew is aboard and the aircraft is operationally ready for flight.

7.6.5. A concerted effort must be made to prevent the hijacking of military or military contract aircraft by detecting potential hijackers before they board the aircraft.

7.6.6. Should preventive efforts fail, any actual attempt to hijack a military aircraft must be resisted in a manner appropriate to the situation.

7.6.7. Since air piracy may be committed by political terrorists or by individuals to whom the threat of death is not a deterrent but a stimulus, ordinary law enforcement procedures may be ineffective. Thus, successful conclusion of a hijacking situation and apprehension of the hijackers may require use of specialized law enforcement techniques and procedures.

7.6.8. Delaying actions have been most successful in overcoming hijackings without loss of life or property.

7.6.9. In the case of an aircraft carrying passengers, the primary concern is the safety of the passengers.

7.6.10. Assistance to hijacked civil or military contract aircraft will be rendered as requested by the pilot in command of the aircraft and the authority exercising operational control of the anti-hijacking effort.

7.7. Preventive Measures. Commanders at all levels must ensure preventive measures are taken to minimize access to the aircraft by potential hijackers. When a C-5 is operating away from home station, the aircraft commander will ensure provisions of this chapter and AFI 31-101V1 are complied with.

7.7.1. Preventive measures include the following: The host station passenger processing or manifesting facility should conduct anti-hijacking inspections. Do not board passengers until the aircraft commander is fully satisfied with inspection results. In the absence of qualified passenger service representatives, the aircraft commander will ensure the anti-hijacking inspection of passengers and baggage is accomplished.

7.7.2. Medical facility commanders are responsible for anti-hijacking inspection of patients. When patients are delivered to the aircraft by civilian sources, the aircrew will perform required inspections

prior to loading.

7.7.3. During exercises or contingencies in support of combat operations involving the movement of large groups of personnel, the unit being supported should manifest passengers and perform anti-hijacking inspections.

7.7.4. Passengers will not carry weapons or ammunition on their person or in hand-carried baggage aboard an aircraft except special agents, guards of the Secret Service or State Department, and other individuals specifically authorized to carry weapons.

7.7.5. If weapons must be cleared, ask the individual to:

7.7.5.1. Move to a safe, clear area at least 50-feet from any aircraft, equipment, or personnel before unholstering or unslinging their weapons.

7.7.5.2. Clear weapons in accordance with standard safety procedures.

7.8. Initial Response. When an act of air piracy involves an Air Force installation or aircraft within the United States, response will be according to the following guidelines until such time as FAA assumes active direction of anti-hijacking efforts. Resist all attempts to hijack a military aircraft. Resistance may vary from simple discussion through deception and subterfuge, to direct physical confrontation, including the prudent use of weapons.

7.8.1. The following guidelines should be used to counter a hijacking, actual or threatened, while the aircraft is on the ground:

7.8.1.1. Delay movement of the aircraft to provide time for ground personnel and the aircrew to establish communication and execute coordinated resistance actions.

7.8.1.2. The authority for determining when ground resistance will be discontinued is vested in the highest available level of command. When adequate communication cannot be established, or when time does not permit, this authority is delegated in the following order:

7.8.1.2.1. MAJCOM commander exercising operational control of the aircraft.

7.8.1.2.2. MAJCOM commanders in whose area of responsibility (AOR) the airfield lies.

7.8.1.2.3. Senior operational commander on scene.

7.8.1.2.4. Aircraft commander in compliance with MAJCOM directives.

7.8.2. A hijacked aircraft carrying weapons of mass destruction will not be allowed to takeoff. Refer to DoD 5210.41M, paragraph 9B(3), for additional guidance.

7.9. In-flight Resistance. After airborne, success in thwarting a hijacking depends on the resourcefulness of the aircrew. Many variables of a hijacking preclude use of any specific counter-hijacking procedure. Some key factors should be evaluated before deciding a course of action to be taken, including the nature of the threat, danger to life or crippling damage to the aircraft in flight, destination indicated by the hijacker, and the presence of sensitive material onboard. Some counter-hijacking actions the aircrew may consider are:

7.9.1. Engage the hijackers in conversation to calm him or her and to evaluate what course of action might be effective.

7.9.2. Dissuade the hijacker.

7.9.3. Use facts or subterfuge to convince the hijacker intermediate stops are necessary.

7.9.4. Propose more favorable alternatives, such as landing in a neutral, rather than a hostile, country.

7.9.5. Exploit any reasonable opportunity to incapacitate or overcome the hijacker physically, including the prudent use of firearms.

7.10. Communications Between Aircrew and Ground Agencies. Crews facing a hijacking threat will notify ground agencies by any means available as soon as practical and follow-up with situation reports as circumstances permit.

7.10.1. If possible, transmit an in-the-clear notification of hijacking to ATC. Controllers will assign IFF code 7500 (does not preclude subsequent selection of code 7700).

7.10.2. If in-the-clear transmissions are not possible, report "am being hijacked" by setting transponder to code 7500. If unable to change transponder code, or when not under radar control, transmit a radio message to include the phrase "(call sign) transponder seven five zero zero."

7.10.3. Controllers will acknowledge receipt and understanding of transponder code 7500 by transmitting "(call sign) (facility name) verify squawking 7500." An affirmative reply or lack of reply from the pilot indicates confirmation and proper authorities are notified.

7.10.4. To report "situation appears desperate; want armed intervention," after code 7500 is used, change to code 7700. If unable to change transponder code to 7700, or when not under radar control, transmit "(aircraft call sign) transponder seven seven zero zero."

7.10.4.1. When changing from code 7500 to code 7700, remain on 7500 for at least 3 minutes or until a confirmation of code 7500 is received from ATC, whichever is sooner, before changing to code 7700. ATC acknowledges code 7700 by transmitting "(call sign) (facility name) now reading you on transponder seven seven zero zero."

7.10.4.2. Aircraft squawking 7700 after squawking 7500, which are not in radio contact with ATC, are considered by ATC to have an in-flight emergency (in addition to hijacking), and the appropriate emergency procedures are followed. Notification of authorities in this case includes information that the aircraft displayed the hijack code as well as the emergency code.

7.10.5. To report "situation still desperate, want armed intervention and aircraft immobilized", leave flaps and slats full down after landing, or select flaps landing while on the ground. To facilitate message distribution, transmit "(aircraft call sign) flaps are full down."

7.10.6. To report "leave alone, do not intervene," retract flaps and slats after landing. Pilots who retract flaps and slats after squawking 7700 should return to code 7500 and remain on code 7500 for the next leg of the hijacked flight unless the situation changes. Transmit "(call sign) back on seven five zero zero" to emphasize the fact intervention is no longer desired.

7.11. Forced Penetration of Unfriendly Airspace. These procedures are designed to deter possible hostile action against the hijacked aircraft that has been forced to penetrate airspace of a nation unfriendly to the United States.

7.11.1. If instructions from the unfriendly nation are received either by radio contact or by air intercept before boundary crossing, comply with instructions received.

7.11.2. If no contact with unfriendly nation is made before approaching a boundary:

7.11.2.1. Maintain TAS not more than 400 knots.

7.11.2.2. Maintain an altitude between 10,000 and 25,000-feet if possible.

7.11.2.3. Fly a direct course toward destination announced by the hijacker, if no course is specified.

7.11.2.4. Transmit the international distress signal, MAYDAY, on any of the international distress frequencies (121.5 MHz, 243.0 MHz, or 2182 KHz) in an effort to establish communications.

7.11.2.5. Set mode 3 code 7700 on transponder.

7.11.2.6. If radio contact cannot be established, follow procedures set forth in FLIP.

7.11.3. Consider the presence of classified documents and equipment aboard the aircraft. When a landing in an unfriendly nation is imminent, attempt to dispose of or destroy the equipment or material.

7.11.4. Refer to Flight Information Handbook for international signals for air intercept.

7.12. Arming of Crewmembers. When crews are directed to carry weapons, the two loadmasters and one flight engineer (normally, the scanner) will be armed. All crewmembers should know who is armed. The following procedures apply when arming is directed:

7.12.1. Issue. Before departing home station, obtain weapons, ammunition, box, lock and key. Crewmembers will be armed according to AFI 31-207, *Arming and Use of Force by Air Force Personnel* and MAJCOM publications. If an armed crewmember must leave the crew en route, transfer the weapon to another authorized crewmember using AF Form 1297, **Temporary Issue Receipt**.

7.12.2. Wearing Of Weapons. Wear weapons in a holster, concealed at all times to prevent identifying armed crewmembers. Do not wear weapons off the flight line except to and from the CCC, armories, and other facilities associated with aircrew activities.

7.12.3. Weapons Storage In Flight. Crewmembers will be armed before beginning pre-flight, on-load or off-load duties and until completion of all post-flight duties. When no passengers are aboard, weapons may be stored in the gun box in flight after a satisfactory stowaway check. Crewmembers will rearm before landing. Weapons need not be unloaded before placing them in a gun box.

7.12.4. Crew Rest.

7.12.4.1. Aircrews, including stage crews, will store weapons and ammunition in the most secure facility available, normally the base armory.

7.12.4.2. Non-stage aircrews may store weapons and ammunition in the aircraft gun box.

7.12.5. When storing weapons in the gun box:

7.12.5.1. Weapons should not normally be unloaded.

7.12.5.2. Advise CCC as to which crewmember has the gun box key.

7.12.6. Crewmembers will ensure they are reissued the same weapon until mission termination at home station.

7.12.7. Loading and Transfer of Weapons. Load and unload weapons at approved clearing barrels if available. Do not use a hand-to-hand transfer of loaded weapons to another crewmember; place the weapon on a flat surface.

7.13. Force Protection. Crews must be alert to possibility of terrorist activities at all times. The

following considerations may help crewmembers avoid becoming victims of terrorism when operating in overseas locations:

7.13.1. Personal conduct. Crews must realize their conduct can make them a target for individuals dissatisfied with US foreign involvement in their national affairs. Local foreign nationals may or may not condone a military presence; crew conduct will be watched and judged. Therefore, comply with the following:

7.13.1.1. Maintain good military bearing both on and off duty.

7.13.1.2. Avoid dressing in clothes that highlight the fact you are an American, i.e., cowboy hats, wide belt buckles, shirts with pro-American slogans, etc.

7.13.1.3. Do not wear clothing displaying profanity.

7.13.1.4. Know where "off-limits" areas are and avoid them.

7.13.1.5. Beware of personnel offering to take you on a "personal" sightseeing tour.

7.13.1.6. Do not get involved with anyone trying to involve you in games of chance.

7.13.1.7. When possible, always travel in groups of two or more.

7.13.1.8. Avoid demonstrations for any cause.

7.13.1.9. Avoid discussion of politics.

7.13.2. Ground transportation security. When traveling to and from billeting, messing facilities, etc. consider the following to minimize drawing attention to yourself as a potential target:

7.13.2.1. Select a plain vehicle; minimize the "rich American" look.

7.13.2.2. If possible, consider not using a vehicle that announces government ownership.

7.13.2.3. Keep the gas tank at least half full at all times.

7.13.2.4. Do a thorough check of the vehicle to look for signs of tampering - look at undercarriage and wheel wells.

7.13.2.5. Park in well-lighted areas, preferably under US control.

7.13.2.6. Always lock the vehicle. If possible, do not leave it on the street overnight.

7.13.2.7. Only leave the ignition key with parking attendants.

7.13.2.8. Before entering vehicles, check for suspicious objects. Look underneath vehicle seats.

7.13.2.9. Guard against establishing a routine. Vary times, routes, and modes of travel. Avoid late night travel.

7.13.2.10. Travel with companions or in convoys when possible.

7.13.2.11. Avoid isolated roads and dark alleys.

7.13.2.12. Ride with seat belts buckled, doors locked, and windows closed.

7.13.2.13. Do not allow the vehicle to be boxed in. Maintain enough interval between you and the vehicle in front so that you can pass.

7.13.2.14. Circle the block for confirmation of surveillance.

7.13.2.15. Do not stop or take other actions which could lead to a confrontation.

7.13.2.16. Recognize events that could signal the start of an attack, such as:

7.13.2.16.1. Cyclist falling in front of the vehicle.

7.13.2.16.2. Flagman or workman stopping the vehicle.

7.13.2.16.3. Fake police or government checkpoints.

7.13.2.16.4. Disabled vehicle/accident victims on the road.

7.13.2.16.5. Unusual detours.

7.13.2.16.6. An accident in which the vehicle is struck.

7.13.2.16.7. Vehicle or pedestrian traffic that box you in.

7.13.2.16.8. Sudden activity or gunfire.

7.13.2.17. Know what to do if you are under attack:

7.13.2.17.1. Consider sounding the horn.

7.13.2.17.2. Put another vehicle between you or your pursuer.

7.13.2.17.3. Execute an immediate turn and escape, jump curbs at a 30-45 degree angle, 35 mph minimum.

7.13.2.17.4. Ram a blocking vehicle only as a last resort.

7.13.2.17.5. Go to the closest safe haven.

7.13.2.17.6. Report the incident to security police.

7.13.3. Personal identification. Consider the following actions to avoid advertising the fact you are an American:

7.13.3.1. Don’t discuss our military affiliation with strangers.

7.13.3.2. Avoid military style luggage such as B-4 bags and duffel bags with military logos, etc.

7.13.3.3. Consider placing your official passport and related documents such as military ID, flight orders, club card, dog tags, billeting receipts in your hand-carried luggage and not in your wallet or purse.

7.13.3.4. Wear conservative styled civilian clothing when using commercial transportation.

7.13.3.5. Remember, the key is to maintain a low profile.

7.13.4. Hotel security. When billeted in commercial hotels, crews need to be aware of the following:

7.13.4.1. If possible, obtain rooms between the second and sixth floors. These rooms are high enough to be less vulnerable to unauthorized entry from the outside and low enough to simplify evacuation if necessary.

7.13.4.2. Always lock interior locks when occupying rooms.

7.13.4.3. Always assume your room is monitored and avoid viewing or discussing classified material.

7.13.4.4. Avoid establishing a predictable routine (e.g., vary eating times and locations).

7.13.4.5. Avoid traveling on foot; use a vehicle (hotel shuttle, commercial taxi, etc.).

7.13.4.6. In high threat areas, stay off the streets (use hotel dining facilities if available).

7.14. Protecting Classified Material on Aircraft. The Aircraft Commander is responsible for protection of classified materials aboard their aircraft. See requirements in AFI 31-401, *Information Security Program Management*. As a minimum, ensure the IFF equipment is set to zero before leaving the aircraft.

Chapter 8

OPERATIONAL REPORTS AND FORMS

8.1. General. Applicable reports and forms are contained in this chapter. Specific reports and forms applicable only to the flight engineer are in **Chapter 12**.

8.2. AF Form 457, USAF Hazard Report. See AFI 91-202, *The US Air Force Mishap Prevention Program*.

8.2.1. The Air Force hazard reporting system provides a means for Air Force personnel to alert supervisors and commanders to hazardous conditions requiring prompt corrective action.

8.2.2. Special Procedures for Hazard Reports Concerning Weather. Complete the front of an AF Form 457 and address it to the parent wing flying safety office. If a computer flight plan deficiency is involved, attach one copy of the AF Form 72, **Air Report (AIREP)**, flight plan form (e.g. AF Form 4113, **Flight Plan and Record** , or AF Form 4053, **Pilot's INS Flight Plan and Log**, and the computer flight plan (CFP) to the report. Send the report so that the parent unit receives it within 5 days.

8.3. AF Form 651, Hazardous Air Traffic Report (HATR). [AFI 91-202; RCS: 11AF-SE(AR)7602, Hazardous Air Traffic Report (HATR)]

8.3.1. The Air Force HATR program provides a means for personnel to report all near midair collisions and alleged hazardous air traffic conditions.

8.3.2. Procedures:

8.3.2.1. Make an airborne report of the hazardous condition to the nearest air traffic control agency (e.g. center, flight service station, control tower, or aeronautical radio station), and give the following information as appropriate:

8.3.2.1.1. Call sign.

8.3.2.1.2. Time and place (radial/DME of NAVAID, position relative to the airfield, etc.) of the occurrence.

8.3.2.1.3. Altitude or flight level.

8.3.2.1.4. Description of the other aircraft.

8.3.2.1.5. Statement that a written HATR report will be filed upon landing.

NOTE:

FAA must know if an official report is being filed.

8.3.2.2. File the HATR as soon as possible (within 24 hours) using any available means of communication. Normally, it should be filed at the Air Force base operations office at the landing airport. If this is impractical and if communications permit, notify the safety office of the Air Force base where the condition occurred, the safety office at the home base, or as prescribed by the overseas major command. In any case, provide the base or wing safety office with all available information needed to prepare AF Form 651. Turn in a completed copy of AF Form 651 to the wing safety office.

8.3.3. To encourage reporting, individuals who submit HATRs are granted immunity from disciplinary action if:

8.3.3.1. Violation was not deliberate.

8.3.3.2. No criminal offense was intended or committed.

8.3.3.3. No mishap occurred.

8.3.3.4. The incident is properly reported.

8.4. USAF Aircraft Mishap Report Worksheet (Aircraft and Personnel Mishaps). *(N/A AFRC)*

8.4.1. Responsibilities. Notify the appropriate authorities of any mishap involving aircraft or crew.

8.4.2. Reportable Mishaps. Report damage to the aircraft or injury to the crew or passengers. Also, any damage or injury to another organization's equipment or personnel resulting from the movements or actions of an AMC aircraft or crew. Reportable mishaps include:

8.4.2.1. Physiological mishaps.

8.4.2.2. Engine flameout, failure, or required shutdown, after engine start with intent for flight, regardless of damage. Report incidents involving two or more engines immediately. Single-engine incidents may be reported upon landing.

NOTE:

Intentional shutdowns for training, functional check flight, or other non-emergency purposes are excluded; however, report failure to restart, using the criteria above.

8.4.2.3. Loss of thrust sufficient to preclude maintaining level flight at a safe altitude.

8.4.2.4. Engine case penetration by shrapnel from internal engine component failure.

8.4.2.5. Engine case rupture or burn-through, engine bay fire, or massive fuel leakage.

8.4.2.6. Unselected thrust reversal.

8.4.2.7. Flight control malfunction (including AFCS and trim systems) resulting in an unexpected, hazardous change of flight attitude, altitude, or heading. When making the AFTO 781A entry, include the flag words "reportable flight control malfunction."

8.4.2.8. Malfunction of landing gear when difficulty is experienced using emergency system or procedures.

8.4.2.9. Cargo door or ramp malfunction when intent for flight exists which could affect the integrity of the system.

8.4.2.10. In-flight loss of all pitot-static instrument indications or all gyro-stabilized attitude or directional indications.

8.4.2.11. Spillage or leakage of radioactive, toxic, corrosive, or flammable material from aircraft stores or cargo that, in the judgment of the reporting individual, is significant hazard to the crew, passengers, or aircraft.

8.4.2.12. Human factors related situation, e.g. misinterpretation of instruments; crew overload, i.e. tactile, aural, and visual input to the crew at a rate too fast to permit reasonable decisions based on

the data received; or too many actions required in too short a period of time; or confusion of controls such as would be caused by adjacent switches where the actuation of the wrong switch could create a dangerous situation. Anonymous reports of such situations are acceptable.

8.4.2.13. All cases of departure from intended takeoff or landing surface onto a surface not designed to normally support takeoff or landing loads.

8.4.2.14. All in-flight fires regardless of damage.

8.4.2.15. Any occurrence which does not meet the established criteria for a reportable mishap, but in the judgment of the reporting individual, needs to be emphasized in the interest of safety.

8.4.3. Procedures. Report mishaps as soon as possible to the following offices using the following precedence:

8.4.3.1. MAJCOM flying safety officer (FSO).

8.4.3.2. Any FSO.

8.4.3.3. Nearest CCC.

8.4.3.4. Base operations.

8.4.4. In all cases, retain a copy of all relevant information, and turn it into a home station safety officer.

8.4.5. Required Information. Complete all appropriate areas of the form. Provide as much detail as possible.

8.5. Reports of Violations/Unusual Events or Circumstances. [RCS: HAF-XOO(AR)7118, Operations Event and Incident Report (OPREP-3)] Violations identified in AFI 11-202V3, alleged navigation errors (including over-water position errors exceeding 24 NMs, border and air traffic control violations) will be reported.

8.5.1. Use the following format and include:

8.5.1.1. Factual circumstances.

8.5.1.2. Investigation and analysis.

8.5.1.3. Findings and conclusions.

8.5.1.4. Recommendations.

8.5.1.5. Actions taken.

8.5.1.6. Attachments to include:

8.5.1.6.1. Notification of incident.

8.5.1.6.2. Crew orders.

8.5.1.6.3. Statement of crewmembers (if applicable).

8.5.1.6.4. Documenting evidence (logs, charts, etc.).

8.5.2. In addition to the information listed, the historical flight plan will be downloaded onto a floppy disk and turned in to the command and control facility or owning standardization and evaluation office.

8.5.3. Send the original investigation report within 45 days to the appropriate MAJCOM. AFRC units receiving alleged violations will send the original investigation through channels to arrive at HQ AFRC/IGI within 35 days. HQ AFRC/IGI will send the investigation report to the MAJCOM within 45 days.

8.5.4. The following OPREP-3 reporting procedures for all aircraft notified of navigational errors exceeding 24 NMs will be reported under AFMAN 10-206, *Operational Reporting*.

8.5.4.1. On notification of a navigational position error, the aircraft commander (or agency receiving notification) documents the circumstances surrounding the incident (report content below) and ensures submission of an OPREP-3 report through CCC channels.

8.5.4.2. Report content:

8.5.4.2.1. Name and location of unit submitting report.

8.5.4.2.2. Mission identification number.

8.5.4.2.3. Reference to related OPREPs-3.

8.5.4.2.4. Type of event. (State "Navigation position error.")

8.5.4.2.5. Date, time (Zulu), and location (i.e. ARTCC area).

8.5.4.2.6. Description of facts and circumstances. Include aircraft type and tail number, unit (wing or squadron assignment of crew), home base, route of flight, point of alleged deviation, and miles off course.

8.5.5. Aircraft commanders must keep MAJCOM C2 agencies apprised of any unusual events or circumstances impacting their missions. Examples of reportable events include meaconing, jamming, intrusion, interception, fuel dumping, loss of multiple engines, hostile fire, injury to passengers or crewmembers, etc. This list is not exhaustive. Some events may require the C2 agency to forward OPREP reports to higher headquarters. The old adage, “when in doubt, report it,” applies.

8.6. Petroleum, Oil, and Lubricants (POL)—Aviation Fuels Documentation. This section describes procedures for the aviation fuel program (AVPOL) for all USAF aircraft. Procedures are established for correct documentation, processing of forms and invoices, program oversight, and personnel responsibilities. Reference AFI 23-202, *Buying Petroleum Products, and Other Supplies and Services Off-Station*, AMC decentralization procedures, and AFM 67-1V1, part 3. An Into-Plane contract information and Aviation Into-Plane Reimbursement (AIR) card acceptor list is also listed under the air card section on the following web page: WWW.KELLY.AF.MIL/SFWEB.

NOTE:

Aviation Into-Plane Reimbursement (AIR) Card. The AIR card is a commercial credit card which allows aircrews to purchase aviation fuel, fuel related supplies, and/or ground services at commercial airports where no DoD/Canadian into-plane contracts exist. Accepted at over 4200 locations, it is intended to replace the AF Form 315 and AF Form 15 at locations that accept the AIR card. All Air Force aircraft will be issued an AIR card. Additional information is available at SF WEB page: WWW.KELLY.AF.MIL/SFWEB/AIRCARD.HTM.

8.6.1. Responsibilities. All aircrew and maintenance personnel will be familiar with the procedures and documentation requirements of this chapter. Purchase of aviation fuel not complying with this

instruction may become the financial responsibility of the purchaser.

8.6.2. Aircraft will be refueled or de-fueled at DoD locations unless DoD-owned fuel is not available; in which case, fuel may be procured from other sources using the following priority.

8.6.2.1. Defense Fuel Supply Center (DFSC) or Canadian into-plane contracts.

8.6.2.2. Foreign government air forces.

8.6.2.3. Open market AIR card purchase, to include Shell International Trading Company (SITCO) agreement.

NOTE:

DoD FLIP en route supplements identify locations with into-plane contracts.

8.6.3. AVPOL Documentation Use and Procedures.

8.6.3.1. AF Form 664, **Aircraft Fuels Documentation Log**. Used to log and store all AVPOL transaction documentation. Log all off-station transactions on front of AF Form 664 then insert the supporting documentation inside the envelope. Turn AF Form 664, with supporting documentation, in at maintenance debriefing (or IAW locally established procedures).

NOTE:

When logging in-flight on-load transactions on the AF Form 664, place the 8-digit tail number of the tanker in the block titled "Airfield Name," and the unit number and home station in the block titled "Airfield Address."

8.6.3.2. The AIR card will be used to purchase aviation fuel, fuel related supplies, and ground services at commercial airports where DoD or Canadian Into-Plane contracts do not exist. Tickets for AIR card purchases will be recorded and placed inside the AF Form 664.

8.6.3.3. AF Form 315, **United States Air Force AVFuels Invoice**. Use this form to purchase fuel at non-DoD and Canadian Into-Plane contract locations and when the vendor will not accept the Air card. See AFI 23-202. Block 4 (Send Bill To) address on the AF Form 315 must reflect the following address: SA-ALC/SFR, 1014 Billy Mitchell Blvd, STE 1, Kelly AFB TX 78241-5603. When completed, log and place inside the AF Form 664.

NOTE:

Vendor must submit original copy of completed AF Form 315 with their invoice to the address indicated in Block 4 for payment. Contrary to what is printed in Block 16 of AF Form 315, the vendor will not be paid until they initiate billing to SA-ALC/SFR.

8.6.3.4. AF Form 15, **United States Air Force Invoice**. This form is used for procurement of items or services required at commercial locations where normal DOD support and supplies are not available. If the vendor will not accept the AIR card, use AF Form 15 to pay for ground fuels, oils, or services. Block 4 (Send Bill To) of the AF Form 15 must reflect the address of the home-station supporting DFAS-OPLOC. When completed, log and place inside AF Form 664. The accomplished form is returned to the aircraft's home station for payment. The responsible resource advisor must validate and certify the completed AF Form 15 and forward to the supporting DFAS-OPLOC for payment. See AFI 23-202.

8.6.3.4.1. Provide the original and one legible copy of the AF Form 315 or AF Form 15 to the

vendor. The vendor must submit the original copy of the AF Form 315/AF Form 15 to the address identified in Block 4 of these forms for payment. A legible copy of the AF Form 315/AF Form 15 must be obtained by the aircraft commander, then logged and placed inside the AF Form 664.

8.6.3.4.2. Purchases at Canadian into-plane locations will be documented using the local vendor's invoice. AF Form 15 or 315 will not be accomplished. Hand scribe the information from the aircraft identaplate to the vendor's invoice, and complete a separate sheet with the information listed on the Aviation Issues to DoD and Non-DoD, Aircraft Refueling Tender Sheet. See AFI 23-202. Log and place a copy inside the AF Form 664.

8.6.3.4.3. Purchases at SITCO Agreement locations require presenting the aircraft identaplate (DD Form 1896). The invoice must include the date of transaction, grade of the product, quantity issued or de-fueled, unit of measure, and signature of the Air Force representative. If the vendor also requires completion of an AF Form 15 or AF Form 315 in addition to their invoice, annotate on the vendor's invoice "AF FORMS EXECUTED." Log and place the documentation inside the AF Form 664.

8.6.3.4.4. Purchases at non-contract (DoD/Canadian Into-Plane) commercial airports will be accomplished using the AIR card or the AF Form 315 and/or AF Form 15 when vendor does not accept the AIR card. Refer to AFI 23-202 for guidelines on completing these forms.

8.6.3.4.5. Purchases at foreign military airfields, including replacement-in-kind (RIK) locations, the host country forms are used to record the purchase. Information from the aircraft identaplate should be hand scribed on the local form. Log and place a copy inside the AF Form 664.

8.6.3.4.6. If an embassy arranges fuel support and pays the vendor in cash, an AF Form 315 must be completed with the addition of the statement in Block 11: "paid by US Embassy". Also include in Block 11, the date, POC, and telephone number of responsible embassy employee. When completed, attach vendor ticket, then log and place inside AF Form 664.

NOTE:

In this situation, do not leave a copy of the AF Form 315 with the vendor. Wing refueling document control officers will forward AF Form 315 to SA-ALC/SFR.

8.6.4. AF Form 1994, **Fuel Issue/De fuel Document**. Used for purchases at all US Air Force locations using a valid DD Form 1896, **Jet Fuel Identaplate**. Log and place inside AF Form 664.

8.6.5. AFTO Form 781H, **Aerospace Vehicle Flight Status and Maintenance Document**. Complete form per applicable technical directives. When removed from jacket, turn in to maintenance. Maintenance will retain for 90 days after inter-fund billing to provide a secondary audit trail for fuels issue and flying hours.

8.6.6. DD Form 1896, **Jet Fuel Identaplate**. Aircraft fuel and oil charge card.

8.6.7. DD Form 1898, **AVFuels Into-Plane Sales Slip**. Fuel transaction receipt used for purchases at other DoD locations, including DFSC into plane contract locations. Log and place inside AF Form 664. If the contractor insists on completing their own invoice in addition to the DD Form 1898, the invoice must be annotated: "DUPLICATE DD FORM 1898 ACCOMPLISHED."

8.6.8. Aircraft commanders will:

8.6.8.1. For local training missions:

8.6.8.1.1. Ensure AFTO Form 781H is completely filled out prior to maintenance debriefing.

8.6.8.1.2. Turn-in AFTO Form 781H maintenance debriefing.

8.6.8.2. For off-station missions:

8.6.8.2.1. Verify that AF Forms 15, 315, 664, 1994; AFTO Form 781H; DD Form 1898; and all associated fuels receipts are completely filled out and placed inside AF Form 664.

NOTE:

All US Air Force aircraft must contain an 8-digit tail number.

8.6.8.2.2. Ensure AF Form 664 with all refueling documentation and AFTO Form 781H are turned in at maintenance debriefing.

8.6.8.2.3. Ensure all AF Form 664 information is phoned, faxed, or sent by message back to the aircraft's home station if aircraft is to be off station past the last day of the month.

NOTE:

When situations arise that preclude transmission of AF Form 664 data, the information will be relayed on arrival from the first available AMC command post.

8.6.9. Flight engineers will:

8.6.9.1. Accurately record all in-flight onloads on the AFTO Form 781H and AF Form 664.

8.6.9.2. Record, when transmitted, receiver refueling information, i.e. tail number, unit of assignment, and home station.

8.6.10. Maintenance personnel will:

8.6.10.1. For local training missions:

8.6.10.1.1. Ensure AFTO 781H is completed and collected for each mission, if required.

8.6.10.2. For off-station missions:

8.6.10.2.1. Verify that AIR card receipts, AF Forms 15, 315, 664, 1994, AFTO Form 781H, DD Form 1898, and all associated fuels receipts are completely filled out and placed inside the AF Form 664. (All USAF aircraft must contain an 8-digit tail number).

8.6.10.2.2. Ensure that AF Form 664, with all refueling documentation and the AFTO Form 781H are turned in at maintenance debriefing.

8.6.10.2.3. Ensure that all AF Forms 664 information is phoned, faxed, or sent by message back to the invoice control officer (ICO) if aircraft is to be off station past the last day of the month.

NOTE:

When situations arise that preclude the transmission of AF Form 664 data, the information will be relayed on arrival from the first available AMC command post.

8.7. AMC Form 54, Aircraft Commander's Report on Services/Facilities. This is an instrument for aircrews to report that services rendered or conditions encountered were unsatisfactory or detrimental to efficient air mobility operations; services rendered or procedures used are worthy of adoption for all MAJCOM organizations; or a performance rendered by a person (or persons) was commendable and

deserves recognition. Attempt to solve problems by contacting appropriate supervisors including the senior commander if conditions and situation warrant. If further action is deemed necessary or the problem requires increased visibility, submit this form. Deliver the completed form as follows:

8.7.1. Submit the form to the originator's squadron commander. Time permitting, leave an information copy with the CP or senior AMC representative on station. Forward an information copy to HQ AMC/DOV. See AMCI 11-208 for processing instructions.

8.8. AMC Form 43, AMC Transient Aircrew Facilities Report. Any crewmember may submit this form. The report may be submitted whether or not an unsatisfactory item is included in the aircraft commander's trip report. Complete AMC Transient Aircrew Facilities Report and send to HQ AMC/SVPS.

8.9. AMC Form 196, Aircraft Commander's Report on Crewmember. The aircraft commander will prepare an Aircraft Commander's Report on Crewmember on each crewmember whose performance was outstanding, below average, or unsatisfactory during a mission. Send the report to the commander of the unit to which the crewmember is assigned or attached for flying. Form should fully explain outstanding, below average, and unsatisfactory performance.

8.10. AMC Form 423, MIJI (Meaconing, Intrusion, Jamming, Interference) Incident Report Worksheet.

8.10.1. Purpose. The MIJI reporting system is a program to identify, analyze, and disseminate information concerning MIJI incidents. Since effective MIJI attempts could have a serious impact on flight safety, reporting under this program should ensure the widest and most rapid distribution.

8.10.2. Procedures. Comply with Air Force direction by reporting all incidents through the OPREP (operations reporting) system. Complete the MIJI Incident Report Worksheet and turn in to base operations upon landing.

Chapter 9

TRAINING POLICY

9.1. Qualification Training. Initial qualification, re-qualification, or upgrade training for pilots will not be conducted on missions with passengers on board.

EXCEPTION: Mission qualification training, en route evaluations, line development missions, and JA/ATTs may be conducted on missions with passengers provided the individual in training is qualified (completed aircraft evaluation with a valid AF Form 8).

9.1.1. Scheduling of Initial Training Flights. Initial training flights for pilots normally will be conducted during daylight under conditions no lower than 600/2. Exceptions to this policy are permitted where extensive periods of bad weather would delay training to an unacceptable degree. Under no circumstances will the first transition training be conducted at night.

9.2. Simulated Emergency Flight Procedures. Simulated emergency flight procedures will be conducted according to AFI 11-202V3, and this AFI. Use a realistic approach and do not compound emergencies.

9.2.1. Policy. Simulated emergencies may be practiced only during training, evaluation, or currency flights when an instructor or evaluator pilot is in one of the pilot seats. IP candidates in a pilot seat and under the supervision of an EP not in a pilot seat may practice simulated emergency procedures during initial or re-qualification upgrade evaluations to IP. Except for practice breakaways, simulated emergency procedures are prohibited during air refueling.

9.2.2. Weather. Simulated single-engine failure or no-flap approaches and landings are authorized in IMC if weather is at or above:

9.2.2.1. Circling minimums during daylight hours.

9.2.2.2. 1000/2 (but not less than circling minimums) during night-time hours.

9.2.3. Passengers. Passengers are prohibited on training, evaluation, or currency flights when simulated emergencies are practiced.

9.2.4. Training Maneuver Restrictions. (See **Figure 9.1**.)

Figure 9.1. Training Maneuver Restrictions.

Maneuver	Altitude Restriction	Remarks
Engine Shutdown	5000-feet AGL (min)	Do not practice actual engine shutdown when purpose of this maneuver can be realized by reduction of power. Under no circumstances will an engine be shut down for engine-out landing or missed approach training. VMC only. *For AETC:* Aircraft commander candidate or higher.
Simulated Engine Failures	(One throttle at idle) Initiate above 500-feet AGL	Simulated engine failures are not authorized at less than 2-engine Vmca. Simulated engine failure will not be practiced when any actual emergency exists, during no-flap landings, or during practice category II ILS approaches. Simulate use of "MIN Q."
Go-Around and Missed Approach		
All engines	Initiate above 100-feet AGL	IPs and EPs shall not plan to initiate a go-around or missed approach below 100-feet AGL.
3 engines	Initiate above 200-feet AGL	Use all engines if initiated below 200-feet AGL.
Personnel and equipment on runway	Initiate above 500-feet AGL	
PACS Off	N/A	Limited to low approach only and not to be practiced in conjunction with simulated engine failure.
No-flap approach	N/A	Full-stop landing only. 15 knot maximum crosswind component. Maximum gross landing weight 525,000 pounds. Landings may be performed on training, evaluation, and currency flights by AC upgrade candidates or higher.

9.3. Touch-and-go Landing Limitations:

9.3.1. Touch-and-go landings will only be accomplished under the direct supervision of an IP or Sq/CC certified AC. Touch-and-go landings may be performed by:

9.3.1.1. IPs, IP candidates on initial or re-qualification instructor evaluations, or EPs in either pilot seat.

9.3.1.2. Any pilot from either seat provided an IP, IP candidate on initial or re-qualification instructor evaluation, or EP is in the other seat.

9.3.1.3. Copilots from the right seat or first pilots from either seat provided a Sq/CC certified touch-and-go aircraft commander is in the other seat and the applicable conditions of this chapter are met.

9.3.2. An in-flight evaluation and Sq/CC certification will be accomplished prior to an AC accomplishing touch-and-go landings without direct IP supervision. The evaluation may occur in conjunction with the initial qualification evaluation. After successful evaluation, ACs must be evaluated on recurring evaluations to maintain touch-and-go qualification.

9.3.3. AC touch-and-go certification:

9.3.3.1. ACs must have accumulated a minimum of 200 hours since AC qualification prior to touch-and-go certification.

9.3.3.2. The SQ/CC determines touch-and-go certification requirements for ACs.

9.3.3.3. Separate SQ/CC certifications are required for ACs to: 1) Accomplish their own touch-and-goes, and 2) Supervise other pilots' touch-and-goes. SQ/CCs will document these certifications using the AF Form 1381, **USAF Certification of Aircrew Training**, in the individual's FEF.

9.3.4. Current and qualified instructor pilots and SQ/CC certified aircraft commanders are authorized to conduct/supervise touch-and-go landings under the following conditions:

9.3.4.1. Flight manual restrictions and procedures apply.

9.3.4.2. Use a runway of sufficient width and length to permit a safe, normal, full-stop landing.

9.3.4.3. Minimum ceiling of 1000-feet and minimum visibility of 2 miles (300-feet and 3/4 miles (RVR 40) for IPs).

9.3.4.4. Wet runway or RCR must be measured 12 or higher.

9.3.4.5. Do not accomplish touch-and-go landings on slush covered runways.

9.3.4.6. Maximum takeoff and landing crosswind component, corrected for RCR, does not exceed flight manual limitations. Do not exceed the normal zone of the runway wind and crosswind component chart. Maximum crosswind component for ACs supervising touch-and-go landings is 15 knots.

9.3.4.7. No performance degrades (e.g., simulated engine failure) for AC supervised touch-and-go landings.

9.3.5. Supervision of touch-and-go landings. Review the following:

9.3.5.1. Flight manual procedures.

9.3.5.2. The importance of smooth application of power to the touch-and-go power setting while maintaining symmetric thrust as the throttles are advanced.

9.3.5.3. Engine failure, including recognition and corrective action.

9.3.5.4. Proper use of flaps and trim.

9.3.6. Touch-and-go landings may be performed with MAJCOM approved maintenance personnel on board, provided the mission is a designated training flight with an instructor or evaluator pilot in command and the personnel are necessary for maintenance evaluations or inspections. Touch-and-go landings are not authorized with other passengers on board.

9.3.7. Touch-and-go landings may be performed with cargo on board provided:

9.3.7.1. T.O. 1C-5A-1 normal landing weight is not exceeded.

9.3.7.2. Cargo security is checked prior to the first touch-and-go and thereafter at an interval determined by the loadmaster (not to exceed 1 hour). ACs must coordinate with the loadmaster and allow additional time for this inspection.

9.3.7.3. AC and loadmaster must determine the suitability of the cargo. Hazardous cargo is not acceptable.

NOTE:

Home station touch-and-go training may be accomplished with diesel powered vehicles on board provided the only listed hazard is "engine internal combustion."

9.4. Instructor Briefing. Before all training/evaluation missions, aircraft commanders or instructors/flight examiners will brief their crews using locally approved briefing guides. As a minimum these guides will contain the following items:

9.4.1. Training/evaluation requirements. Instructors/evaluators (for each crew position) will outline requirements and objectives for each student or examinee.

9.4.2. Planned training area and seat changes.

9.5. Debriefing. After all training missions, instructors will review and evaluate overall training performed and complete training reports.

9.6. ***Not used.***

9.7. ***Not used.***

9.8. Manual Gear Lowering. For training purposes, manual lowering of landing gear may be demonstrated to simulate an electrical power failure that would require manual actuation and override of normal landing gear selector valves. Current procedures in section III of T.O. 1C-5A-1 will be followed with the following exceptions:

9.8.1. Control circuit breakers for the gear to be manually extended will be opened prior to initiating the emergency extension checklist.

9.8.2. Landing gear emergency extend switches located on the control pedestal will not be used for practice emergency extension.

NOTE:

All training objectives pertaining to emergency extension of the gear using emergency extend switches can be accomplished in the flight simulator.

9.9. Prohibited Aircraft Training Maneuvers:

9.9.1. Simulated engine out takeoffs.

9.9.2. Approach to stalls and full stalls.

9.9.3. Dutch rolls.

9.9.4. Simulated runaway pitch trim malfunctions.

9.9.5. Simulated two engines out landings and missed approaches.

9.9.6. Jammed stabilizer.

9.9.7. Landing with inoperative hydraulic system.

9.9.8. RAT deployment.

9.9.9. In-flight gear kneeling.

9.9.10. No-slat landing.

9.9.11. Minimum run landings.

9.9.12. Steep turns (over 45 degrees of bank).

9.9.13. Aborted takeoffs.

9.9.14. Unusual attitudes.

9.9.15. Emergency descents.

9.9.16. Emergency boom latching.

9.9.17. PACS off landing.

9.9.18. Simulated 3-engine approach, landing and go-around (copilot only).

9.9.19. Simultaneous simulated engine failures and no flap approach training.

9.10. Mission Cancellation. If an aircraft is not in commission or otherwise capable of departure within 4 hours after scheduled departure time, the training mission will be canceled and crew rescheduled. Exceptions will be granted only with concurrence from the aircraft commander. Air National Guard aircrews under operational control of ANG may be extended beyond 6 hours with concurrence of the unit DO.

9.11. Simulated Instrument Flight. Simulated instrument flight may be flown and logged without use of a vision-restricting device.

9.12. Category II ILS Training. Flight training and evaluation may be conducted using any ILS where signal output is accurate and stable enough to achieve the desired training.

9.12.1. Weather. No lower than 200-feet/RVR 24 (visibility ½ mile).

9.12.2. Winds. Maximum crosswind component of 15 knots.

9.12.3. When a category II decision height is not published, DH for training will be based on a height above terrain of 100-feet.

Chapter 10

LOCAL PROCEDURES

10.1. General. Units will define local operating procedures in this chapter.

Chapter 11

NAVIGATION PROCEDURES

Section 11A—Aircrew Procedures

11.1. General. This chapter consolidates unique navigation procedures into one location.

11.2. Mission Planning:

11.2.1. The aircrew will verify that proposed routes and flight altitudes and levels provide proper terrain clearance and meet FLIP and Foreign Clearance Guide requirements.

11.2.2. Crosscheck the computer flight plan (CFP) route of flight against the route of flight entered on the DD Form 175, **Military Flight Plan**, DD Form 1801, **DoD International Flight Plan**, or International Civil Aviation Organization (ICAO) flight plan.

11.2.3. If a CFP is out of date or not available and routing or meteorological information is desired, obtain direct assistance from the TACC flight planner. In addition, all AMC CFP tracks are on microfiche at selected locations. Use these products to assist in manual flight planning.

11.3. Flight Charts:

11.3.1. Prior to flight, plot the oceanic portion of the flight on an appropriate chart (e.g. OPC, GNC, Jeppesen). Place the following information on the chart:

11.3.1.1. Mission number.

11.3.1.2. Preparer's and aircraft commander's name.

11.3.1.3. Date.

11.3.1.4. Flight plan course depicting reporting points with proper names.

11.3.1.5. On AR missions, plot the ARIP, ARCP, exit, and turn points.

11.3.2. Multiple legs on the same chart are permissible (e.g., Hickam, Wake Island, Guam) when practical.

11.3.3. Following mission completion, turn in the applicable items: charts, CFPs, fuel planning calculations, and the navigator's log. Maintain them as a part of the flight records a minimum of 90 days.

11.4. Navigation Procedures:

11.4.1. Flight Progress:

11.4.1.1. General. When using the INS/GPS as the primary means of navigation, use all available NAVAIDs to monitor INS/GPS performance and ensure compliance with course and ETA tolerance. On airways, INS/GPS may be coupled to the autopilot provided the applicable airway NAVAIDs are selected and monitored on the other HSI and BDHI.

11.4.1.2. Category I Routes. Use the following to monitor flight progress on Category I routes.

11.4.1.2.1. When possible, obtain a coast-out fix prior to or immediately upon entering the category I route segment. Plot the fix on the chart using the procedures in **Table 11.1.**

Table 11.1. Category I Fixing.

Airplanes not modified with FMS/GPS	Airplanes modified with FMS/GPS
Record aircraft position in relation to NAVAIDs and simultaneously go to "hold" on all INSs. Record INS triple mix position and all 3 INS pure inertial positions on the chart. Plot coast-out fix. Compare coast-out fix to the INS triple mix or GPS position.	All 3 CDUs – **INAV** Toggle arrows until **INU CONTROL** is displayed at **LS4** (INU1, INU2 and INU3 pages will be displayed) Select **LS4** – **INU CONTROL** Toggle **LS1** until **:WAY PT** is displayed When at desired coast out point, simultaneously press **LS6 – HOLD** on all 3 CDUs and press the **MARK** key on any one CDU at the same time. Annotate displayed coordinates from each CDU. Note: The position displayed in the scratchpad is the position as computed by the pilot's selected navigation solution. For example, if the pilot has INU1/GPS selected to navigate (see **STEER** page), this is what will show up in the scratch pad. Annotate scratch pad position (in lieu of triple mix position). To determine coast out fix coordinates based on ground NAVAID radial/DME, access user waypoints page (**EDIT**; **LS3 – WAYPT**). Put coast out fix in any slot, e.g., **ENO/270/070**. Press **DATA** then the line select key associated with the last entry. The coordinates for that fix will be displayed. The easiest way to check the distance between any two sets of coordinates is to insert both of them into the alternate flight plan as waypoints, then back out to the main alternate flight plan page and select **LS2 – LEG 1**. Scroll until the desired data is displayed.

11.4.1.2.2. When approaching each waypoint, recheck the coordinates for the next waypoint.

11.4.1.2.3. Approximately 10 minutes after passing each oceanic waypoint, record and plot the INS triple mix position (steering solution position for airplanes modified with FMS/GPS), GPS position (N/A for airplanes modified with FMS/GPS), and time on the chart, and ensure compliance with course and ETA tolerances.

11.4.1.2.4. If a revised clearance is received, record and plot the new course on the chart.

11.4.1.2.5. After coast-in, check the INS/GPS positions to determine if a position update is desired. Update manually or use TACAN mixing.

11.4.1.3. Immediately report malfunctions or loss of navigation capability which degrades centerline accuracy to the controlling ARTCC.

11.4.2. Inoperative Inertial Navigation Units. Use GPS position, if available, to cross check remaining INS positions to determine accuracy of remaining inertial navigation units.

11.4.2.1. One unit inoperative:

11.4.2.1.1. If the 10-nautical mile error annunciator light has not illuminated; proceed per normal operations, and fly off either INS.

11.4.2.1.2. Difference between INSs 10-20 NMs:

11.4.2.1.2.1. Monitor, check position using available NAVAIDs.

11.4.2.1.2.2. Attempt to establish which INS is most accurate. If unable to determine which INS is in error, split the difference.

11.4.2.1.3. Difference between INSs 20-40 NMs:

11.4.2.1.3.1. Comply with paragraph **11.4.2.1.2**.

11.4.2.1.3.2. Check ground speed, wind, drift, and compare heading to CFP (this may provide a good indication of the faulty INS).

11.4.2.1.4. Difference between INSs over 40 NMs:

11.4.2.1.4.1. Comply with paragraphs **11.4.2.1.2** and **11.4.2.1.3**.

11.4.2.1.4.2. Obtain winds and ground speed from nearby aircraft or ARTCC to help determine the most accurate INS.

11.4.2.1.4.3. Determine which INS is correct by checking which INS is following the CFP most closely and use it as primary.

11.4.2.2. Two units inoperative. In addition to the above guidance:

11.4.2.2.1. Advise ARTCC unless within range of normal radio aids.

11.4.2.2.2. Check the accuracy of the INS using all available NAVAIDs.

11.4.2.3. Three units inoperative. In addition to the above guidance:

11.4.2.3.1. Advise ARTCC.

11.4.2.3.2. Monitor compass heading.

11.4.2.3.3. Use CFP as a guide. If CFP has been in error prior to INS failure, request reanalysis from the weather support unit at TACC.

11.4.2.3.4. Try to obtain an HF DF fix.

11.4.3. Specific Procedures:

11.4.3.1. North Atlantic and US west coast or Hawaii route minimum navigation performance specification (MNPS):

11.4.3.1.1. MNPS standards (FLIP AP/2) are mandatory.

11.4.3.1.2. Aircraft that lose one INS prior to airspace entry may continue.

11.4.3.2. North Pacific Region. Aircraft on route that lose radar capability at any point may continue when one INS is inoperative providing INS accuracy can be monitored and radar is not required for weather avoidance. If INS accuracy cannot be determined, either re-file a flight plan on another track (fuel permitting) or return to the nearest facility possessing maintenance capability.

11.4.4. Grid Operations. Operations above 70 degrees north and below 60 degrees south require thorough study and understanding of instrument approach procedures (IAP) and of INS procedures and heading displays. The aircraft commander will decide whether headings will be magnetic, grid, or true oriented and ensure the copilot and jump seat pilot understand what type heading is being displayed on the HSIs, BDHIs, and CDUs.

NOTE:

Grivation (GV) shown on the IAP applies to other aircraft and will not be used for C-5 operations. IAPs above approximately 65 degrees north contain the following notice: "Grid courses are true polar courses and convergence angle factor shall not be applied." Convergence angle factors apply to subpolar navigation charts used by aircraft other than the C-5 and must not be used. C-5s will use a convergence factor of 1.00000.

11.4.4.1. AR Rendezvous. Coordinate with the tanker to ensure a common heading reference is used. If grid is used, program INSs using the same convergence value as the tanker.

11.4.5. Magnetic Heading Operations:

11.4.5.1. Departure. Program the airfield magnetic variation after the INSs are in the "NAV" mode. Variation programmed while in the "ALIGN" mode will revert to "0" when the INS is switched to "NAV." Crosscheck the HSI and BDHI readings against the standby compass and runway heading.

11.4.5.2. Arrival. Program the airfield MV as depicted on the IAP.

Section 11B—Low-Level Navigation Procedures

11.5. General. This chapter provides mission planners and aircrews guidance necessary to plan and accomplish low-level missions. Special operations (SOLL II) crews see procedures in AFI 11-2C-5 Addenda B.

11.6. Mission Planning. Use a TPC or sectional charts. See **Chapter 16** for planning procedures.

11.7. En Route Procedures:

11.7.1. Weather. The low-level route must be flown in VMC. If IMC is encountered, maneuver over or around the weather, or abort the mission. The primary procedure is to change course as required to avoid IMC. The secondary procedure is to climb over the weather. If unable to maintain VMC, immediately execute a climb to the emergency safe altitude, turn IFF, to emergency, declare an emergency, and obtain ATC clearance.

11.7.2. Either the pilot or copilot flies the aircraft with reference to terrain and the radar altimeter. Use of the autopilot is encouraged. INS/GPS should be selected for display on the pilot's HSIs.

11.7.3. The pilot not flying the aircraft maintains an outside scan, identifies turn points and

checkpoints, and ensures clearance from terrain obstructions and other aircraft. The crewmember occupying the jump seat will assist in these duties. If a navigator is assigned to the crew, map reading duties are shared with the copilot.

11.7.4. Use all available aids (i.e. INS/GPS, map reading, radio aids, and radar) to remain position oriented. Use known landmarks to crosscheck INS/GPS accuracy.

11.7.5. Prior to each turn point or altitude change point, brief the next altitude and heading as appropriate.

11.7.6. When the next leg altitude is higher than the leg being flown, cross the check-point at the higher altitude. If the next leg altitude is lower than the leg being flown, descend past the checkpoint.

11.7.7. A climb to emergency safe altitude should be initiated when any of the following conditions occur.

11.7.7.1. Position is uncertain (not known within 10 NMs of centerline).

11.7.7.2. Inadvertent weather penetration.

11.7.7.3. Crew becomes disoriented.

11.7.7.4. Either pilot must leave the seat during low-level flight.

11.7.7.5. Aircraft or equipment malfunctions will distract the crew from primary duties.

Section 11C—Navigator Procedures

11.8. General:

11.8.1. When navigators are assigned to crews on missions other than special-operations low-level II (SOLL II) or airdrop, they will coordinate with the aircraft commander to determine duties involving flight or fuel planning and en route requirements. In addition to those duties, the navigator will:

11.8.1.1. Monitor the primary UHF or VHF radio, UHF guard, and the HF radio when advised that a clearance is expected.

11.8.1.2. Record and monitor the read back of all clearances including taxi, departure, en route, and approach.

11.8.1.3. Monitor applicable charts, SID, terrain charts, and available flight instruments to ensure terrain and obstacle clearance during all departures and arrivals.

11.8.2. Low-level charts will be turned in and maintained for 120 days. At the end of 120 days, each chart is returned to the appropriate navigator. Charts used for low-level training missions within the unit's local flying area may be retained by the navigator.

11.9. Navigation Procedures:

11.9.1. General:

11.9.1.1. The navigator who prepares or accepts the flight plan remains on duty at the navigator's station during departure and is the one who briefs the relieving navigator thoroughly on all en route and destination hazards.

11.9.1.2. Waypoint data inserted into the INS/FMS will be verified by another primary crewmember. Check both the coordinate information and the distances between waypoints against the flight plan.

11.9.2. Departures and Arrivals:

11.9.2.1. On departure, monitor aircraft position using available flight instruments to ensure the aircraft remains clear of obstructions.

11.9.2.2. In addition to using applicable FLIP area charts, SIDs, STAR, approach plates, etc., use a terrain chart to monitor the aircraft position during departures and arrivals. The terrain chart will be a scale of at least 1:1,000,000 (ONC).

Chapter 12

FLIGHT ENGINEER PROCEDURES

12.1. General. This chapter contains normal procedures for flight engineers (FE) not contained in the flight manual or applicable technical orders (T.O.).

12.2. Responsibilities. First Engineer. A first engineer is fully qualified to perform all primary FE duties. The primary FE, designated on the flight authorization, is responsible to the aircraft commander for all inspections and procedures required by the applicable technical orders and directives. He or she is the technical advisor to the aircraft commander pertaining to all aircraft systems and procedures.

12.2.1. Second Engineer. A second engineer is not fully qualified to perform all FE duties. A qualified second engineer can perform scanner duties without direct supervision and is responsible to the primary engineer for the completion of all duties for which they are qualified. When performing primary FE duties, the second engineer must be under the supervision of an instructor or flight examiner.

EXCEPTION: When scheduled as a basic crewmember, the second engineer may occupy the primary crew position during cruise while under direct supervision of a qualified first engineer. The second engineer may be left unsupervised, for a brief period during cruise, for physiological reasons.

12.3. Authority to Clear Red X Symbols. FEs are not normally authorized to clear a Red X. If a situation is encountered where the aircraft is on a Red X and qualified maintenance personnel are not available to clear it, the most qualified FE on the scene may obtain authorization from the logistics group or operations group commander or designated representative or chief of maintenance, in accordance with T.O. 00-20-1. Other crewmembers are not authorized to clear a red X..

EXCEPTION: A first engineer or above may clear red Xs for fan stops, pitot covers, gear pins, engine cowls, access panels, throttle lock plates, and single-point refueling (SPR) drains when qualified maintenance personnel are not available, unless prohibited by the home station logistics group or operations group commander or designated representative or chief of maintenance.

12.4. Aircraft Servicing. FEs normally are not required to refuel or defuel aircraft; however, they are authorized to refuel and defuel when maintenance personnel are not available. The applicable refueling and defueling checklist shall be used during all refueling and defueling operations. If ground support personnel are not available, the aircraft commander will designate other crewmembers to assist the FE. Aircrews will not refuel at bases with AMC support except in isolated cases when critical contingency tasking dictate their use, provided this action does not impact crew duty and crew rest limits specified in **Chapter 3**.

12.4.1. Refueling at nonsupport stations. When crewmembers are required to refuel due to lack of maintenance support, two refueling qualified personnel and an additional individual for scanner or safety duties are required. The additional individuals will be briefed on duties by the refueling team supervisor.

EXCEPTION: If left and right SPRs are used, two qualified personnel and two additional individuals are required.

12.4.2. Concurrent Servicing Operations. Concurrent servicing operations are potentially hazardous. The Chief Servicing Supervisor (CSS) is responsible for controlling and monitoring all concurrent operations. All personnel will report to the CSS prior to entering the concurrent servicing area. Personnel

supervising portions of the operation will coordinate each phase of their concurrent operations with the CSS and report any condition that might jeopardize safety prior to and during concurrent servicing operations. Individuals must properly ground themselves before boarding the aircraft or handling fuel servicing equipment. The following guidance will be used for fuel servicing (refuel) operations only:

12.4.2.1. Concurrent operations are not authorized during aircraft defueling operations.

12.4.2.2. Electric or electronic equipment may be on provided it does not radiate energy, but do not turn on or off during refueling.

NOTE:

Circuit breakers and instrument ground switches are not required to be opened during concurrent servicing operations.

12.4.2.2.1. Radar altimeters and tactical air navigation (TACAN) must be off.

12.4.2.2.2. Radar may be in standby, test, or off.

12.4.2.2.3. Identification, friend or foe (IFF), selective identification feature (SIF) may be in standby or off.

12.4.2.2.4. Inertial navigation system (INS) fuel savings sensory system (FSAS) may be turned "on" and updated.

12.4.2.2.5. Malfunction, detection, analysis and recording (MADAR) may be updated.

12.4.2.2.6. Radio transmissions on UHF and VHF radios are authorized.

12.4.2.3. Winching of rolling stock and non-spark producing pallets is authorized. Driving vehicles equipped with spark arrests is authorized during fuel servicing. When loading vehicles without spark arresters, the vehicles must be completely inside the cargo compartment or outside of the established fuel servicing safety zone before fuel servicing lines can be pressurized.

EXCEPTION: All diesel and turbocharged (without wastegates) gasoline-powered vehicles can be onloaded and offloaded without having to stop fuel flow.

12.4.2.4. Passengers are not allowed on board unless expressly directed by the AMC Director of Operations (HQ AMC/DO) or in combat. Passengers are prohibited in the cargo compartment during winching.

12.4.2.5. Oxygen servicing is not permitted.

12.4.2.6. Aircraft auxiliary power units (APU) and air turbine motors (ATM) may be used during concurrent refueling. Judgment must be used; see requirements in T.O. 00-25-172 and 1C-5A-2-1CL-6.

12.4.2.7. FEs performing refueling and defueling operations, including concurrent servicing, will comply with T.O. 00-25-172 and 1C-5A-2-1CL-6.

12.5. ***Not used.***

12.6. Aircraft Structural Integrity Program. The purpose of this program is to provide a reliable system for predicting potential or impending failures based on historical records of the aircraft's exposure to those actions contributing to fatigue failures.

12.6.1. The program is monitored through the use of AF Form 4097, **C-5 Aircraft Fatigue Tracking Worksheet**.

12.6.2. Flight engineer will:

12.6.2.1. Ensure all applicable sections of AF Form 4097 are completed according to procedures in paragraph **12.22**.

12.6.2.2. Initiate a new form by completing section I.

12.6.2.3. Place all completed AF Forms 4097 in the aircraft stowage pouch along with the newly initiated form.

12.6.2.4. At home station, remove all completed AF Forms 4097 from the pouch and turn them into the maintenance debriefer.

***NOTE*:**

When no maintenance debriefer meets the aircraft (i.e. first period local, mission thru-flights, debriefer not available), AF Forms 4097 will be left in the pouch. (Units may establish local procedures if deemed necessary to minimize lost forms.)

12.6.2.5. When interflying with another wing's aircraft, the engineer returning the aircraft to its home station will turn in all completed AF Forms 4097 to the maintenance debriefer. (The note above applies.)

12.6.2.6. When delivering an aircraft to depot or another wing, the engineer will return all completed AF Forms 4097 for routing to the home-station maintenance documentation section.

12.6.2.7. Always leave the newly initiated form in the storage pouch.

12.7. Fault Code Reporting Procedures.

12.7.1. The fault reporting method (FRM) is used to isolate system malfunctions with a minimum amount of troubleshooting and provide a description of the malfunction for maintenance.

12.7.2. System malfunctions, whether monitored by MADAR (auto or manual) or observed by a crewmember, will be troubleshot using the FRM or fault isolation manual (FIM) procedures contained in MADAR to the maximum extent possible.

12.7.3. The manual fault code (FC) from the troubleshooting routine and the auto fault code reported by MADAR will be recorded in AFTO Form 781A along with the description of the malfunction. Include any additional information required for clarification of the discrepancy.

12.8. Performance Data Computations. T.O. 1C-5A-1-1 will be used for all performance computations. TOLD computations will be placed on the AF Form 4098, **C-5 TOLD Card**. All performance data will be computed by a first flight engineer or higher and checked by the pilot. A second engineer may compute performance data only under the supervision of an instructor. In lieu of the pilot checking the data, the performance data may also be checked by another qualified flight engineer.

12.8.1. Runway slope calculations. When using non-DoD/NOAA airfield diagrams and approach plates to determine runway information for takeoff and landing data calculations, the aircrew must calculate runway slope since non-DoD/NOAA publications do not do this for you. To calculate runway slope you must extract the departure end elevation and approach end elevation from the airfield diagram and use the following formula:

$$\text{Slope in Percent} = \frac{(\text{Departure End Elevation} - \text{Approach End Elevation}) \times 100}{\text{Runway Length}}$$

12.9. through 12.11. ***Not used.***

12.12. L-Band SATCOM. During the aircraft pre-flight the flight engineer performing inside duties will accomplish the laptop pre-flight and initialize satellite communications. All other operations will be completed by the scanner or any other designated crewmember.

12.13 through 12.16. ***Not used.***

12.17. AF Form 4054, Performance and Fuel Management Log. The purpose of this form is to provide the aircraft commander a snap shot view of aircraft performance and fuel consumption during the mission.

12.17.1. Flight engineer will:

12.17.1.1. Provide this information to the aircraft commander (or designated representative) on the AF Form 4054.

12.17.1.2. Ensure all applicable sections of the AF Form 4054 are completed according to procedures in paragraph **12.23**.

12.17.1.3. Ensure all completed AF Forms 4054 are turned into squadron standardization/evaluation section upon mission completion. Squadron standardization/evaluation will maintain the forms for a minimum 60 days from date of form initiation.

12.18. Monitoring Primary Radios. The FE will monitor the primary radio for flight clearances, altitudes, heading changes, and radio frequencies. The FE is not required to copy departure clearances.

12.19. Scanner Duties. After takeoff, the scanner will normally make a walk-around when flaps are retracted, the after-takeoff climb checklist has been initiated, and the airplane is clear of turbulence. The walk-around should be completed by 10,000-feet altitude.

12.20. Ground Refueling Procedures with Inoperative Fuel Quantity Indicators:

12.20.1. The tank with the inoperative indicator and the corresponding tank on the opposite wing will be emptied and will not be serviced by maintenance.

12.20.2. When a single refueling unit is used, the tank with the inoperative fuel quantity indicator will be filled individually and prior to the remaining tanks, when possible, within the wing loading limitations.

12.20.3. When a dual refueling unit is used, the tank with the inoperative fuel quantity indicator and the corresponding tank on the opposite wing may be filled simultaneously.

12.20.4. The refueling unit shall be used to determine the amount of fuel in the tank with the inoperative indicator.

12.20.5. As an alternative, a known quantity of fuel may be transferred from an adjacent tank to a tank with inoperative quantity indicator. The crew will transfer fuel internally to the configuration or sequence required prior to flight when servicing is completed according to paragraph **12.20.6**.

12.20.6. Maintenance may service the aircraft to the following fuel values without the aircrew monitoring:

12.20.6.1. Outboard main tank inoperative—284,000 pounds.

12.20.6.2. Inboard main tank inoperative—281,000 pounds.

12.20.6.3. Outboard or inboard auxiliary tank inoperative—269,000 pounds.

12.20.6.4. Outboard or inboard extended range tank inoperative—278,000 pounds.

CAUTION

Observe wing differential loading limits.

12.21. Wheel and Brake Procedures. If dragging wheels or brakes are suspected during taxi, deplane the scanner and comply with Paragraph 12.21.1.1 through Paragraph 12.21.1.5. Comply with paragraphs **12.21.1** and **12.21.2** if any portion of the fire suppression system (FSS) wheel well fire detecting system is inoperative.

12.21.1. Predeparture End-of-Runway Inspection for Overheated Brakes. This is applicable to all departures unless the aircraft is parked on or immediately adjacent to the takeoff portion of the active runway. The aircrew will complete the predeparture end-of-runway inspection as follows:

12.21.1.1. Use the scanner and another crewmember other than the pilot, copilot, or FE. The additional crewmember deplanes with the scanner and performs scanner duties while the scanner accomplishes the brake check.

12.21.1.2. Maintain interphone contact throughout the inspection.

12.21.1.3. To inspect, approach directly from the front or rear of the tire, touch main landing gear tire and cautiously move the hand toward the wheel. Then place the hand near the brake to determine excessive heat without touching the brake surface. Repeat for each main landing gear (MLG) wheel and brake assembly.

12.21.1.4. If any brake is significantly hotter than the majority, advise maintenance that corrective action is required. If an obviously dangerous overheated condition is observed, do not taxi the airplane.

12.21.1.5. If no brake is found significantly hotter than the majority of brakes, the brake check is satisfactory.

12.21.2. In-flight Procedures:

12.21.2.1. Inspect the MLG wheel wells after takeoff for evidence of heat, smoke, or fire. If abnormalities are detected, extend the landing gear immediately at or below 250 KCAS/.60 Mach.

12.21.2.2. Inspect the cargo compartment sidewall and floor areas adjacent to the MLG wheel wells for evidence of heat (discoloration or variation in surface temperature) at 15-minute intervals for the first hour of flight. Inspect hourly for the remainder of the flight.

12.22. AF Form 4097, C-5 Fatigue Tracking Record.

12.22.1. The AF Form 4097 will be closed out after each sortie, runway abort, or landing on a substandard runway. The criteria in AFI 11-401, and MAJCOM supplement, pertaining to sorties, landing, and flying time entries made in the AFTO Form 781 by the pilot in command apply, with the following exceptions:

12.22.1.1. Do not start a new log for in-flight mission symbol changes.

12.22.1.2. Do not start a new log for practice full stop landings at a point other than the point of takeoff.

12.22.1.3. Start a new log when the aircraft remains on the ground more than 20 minutes after touchdown, regardless of circumstances.

12.22.2. Weights. Except for section VI, enter weights to the nearest thousand pounds. Always right-adjust the three columns. For example, enter a weight of 94,500 pounds as 095. For section VI, enter values in thousands and tenths of thousands, such as 94.5 for the above example.

12.22.3. Altitudes. Enter altitude to the nearest thousands of feet in section III. Enter altitude as thousands and tenths of thousands of feet in section V. The decimal point is on the form. (***EXAMPLE:*** Enter 24,600-feet as 24.6 in section V.)

12.22.4. Instructions. Accuracy and neatness are essential. All numbers and letters must be legible. Do not use diagonal marks (/) on zeroes.

12.22.4.1. Section I, Aircraft Identification. Complete an AF Form 4097 for each sortie or condition as defined in paragraph A1.1.1. Do not complete a log for any ground operation or sortie that does not involve an attempted takeoff. This includes ground aborts for maintenance, operations, weather, and onload or offload exercises. When a sortie is terminated before an attempted takeoff, transcribe the section I information contained on the log to a new AF Form 4097. Use the same log number.

12.22.4.1.1. Effective Date. The Zulu date the form is started. For each mission departure from home station, the AFTO Form 781J, **Aerospace Vehicle-Engine Flight Document**, will contain the correct information for the effective date and columns 1-20 in a special block. This information will be used for confirmation. All discrepancies on the AF Form 4097 will be corrected to agree with the AFTO Form 781J.

12.22.4.1.2. Columns 1-3. Aircraft tail number: Enter the last 3 numbers of the aircraft's serial number.

12.22.4.1.3. Columns 4-8. Log number: Only one log number will be used for each sortie flown. Place the year in columns 4-5. Right adjust the remaining three digits, ending in column 8. Unused columns should contain zeroes. No dashes are permitted. ***EXAMPLE:*** The ninth log of the calendar year 1998 would be entered as 98009.

12.22.4.1.4. Column 9. Normally, the letter "A" will be entered in this column. (***EXCEPTION***: Enter C when ALDCS is off; enter D when air refueling with a KC-10 tanker and ALDCS is off; enter E when air refueling with KC-10 tanker and ALDCS is on.) In instances when additional AF Forms 4097 are needed (i.e. aborted takeoff, aircraft remaining on the ground more than 20 minutes after an intermediate landing, landings on substandard runways), add a suffix letter beginning with B through Z with the exception of C, D, and E explained above. (***EXAMPLE***: Initial log number 98011A, aircraft aborts takeoff for a door warning light on--initiate new log with number 98011B. Aircraft makes a full stop landing with taxi back for another takeoff, but is delayed on the ground over 20 minutes--initiate a new log with number 98011F. The mission is then completed after further flight. The aircraft has flown one sortie and has used one log number although three AF Forms 4097 are completed.)

***NOTE*:**

When an AF Form 4097 is initiated for a flight that is aborted on the runway during an attempted takeoff

resulting in mission termination, the form will be completed as much as possible. Include the reason for the abort in the remarks section.

12.22.4.1.5. Columns 10-12. No entries will be made in these columns.

12.22.4.1.6. Columns 13-17. Airframe hours: To nearest hour. Decimal and tenth of hour omitted.

12.22.4.1.7. Columns 18-20. AGS: Aircraft Generation Squadron. (***EXAMPLE***: 60 AGS would be entered as 060.)

12.22.4.2. Section II, Initial Takeoff and Final Landing Data. Complete section II as follows: FE--enter rank, last name, and organization of FE at panel for takeoff.

12.22.4.2.1. Initial Takeoff Data:

12.22.4.2.1.1. Columns 21-24. Date: Enter the takeoff Zulu date as day and month.

12.22.4.2.1.2. Columns 25-27. Gross weight: Aircraft gross weight at brake release. (Zero fuel weight plus columns 30-32, fuel weight at takeoff) Entry will be to the nearest thousand pounds. (See paragraph **12.22.4.6.2**.)

12.22.4.2.1.3. Columns 28-29. CG: Takeoff center of gravity to the nearest whole percent.

12.22.4.2.1.4. Columns 30-32. Fuel weight: Fuel weight at brake release to the nearest thousand pounds. (See paragraph **12.22.4.6.2**.)

12.22.4.2.1.5. Columns 33-36. Time Z: Sortie takeoff time to agree with the takeoff time as recorded on the AFTO Form 781. (See EXCEPTIONS at paragraph **12.22.1**.)

12.22.4.2.1.6. Columns 37-40. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the takeoff occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of takeoff in the remarks section.

12.22.4.2.1.7. Column 41. Substandard runway: Enter an "X" if the runway is not asphalt or concrete.

12.22.4.2.2. Final Landing Data:

12.22.4.2.2.1. Columns 42-44. Fuel weight: Fuel weight at engine shutdown or 5 minutes after final touchdown, whichever comes first, to the nearest thousand pounds.

***NOTE*:**

This entry and the fuel entry (columns 30-32) are extremely important and must be accurate. The chronological event (cruise periods, touch-and-go (T&G), intermediate full stops and takeoffs) fuel weight is computed using the initial takeoff and final landing fuel weight.

12.22.4.2.2.2.Columns 45-48. Time Z: Sortie landing time as recorded on the AFTO Forms 781. (See EXCEPTIONS at paragraph **12.22.1**.)

12.22.4.2.2.3. Columns 49-52. Airfield ICAO code: ICAO designation (4 letters) for the airfield at which the final landing occurred. If no ICAO code is listed for an airfield, leave blank and annotate the name of the airfield of landing in the remarks section.

12.22.4.2.2.4. Column 53. Substandard runway: Enter an "X" if the runway is not asphalt or

concrete.

12.22.4.2.2.5. Column 54. Fuel sequencing: Enter "S" for standard fuel sequence; enter "N" for nonstandard fuel sequence. When "N" is entered, make an entry in the remarks block to indicate fuel quantity in each tank containing fuel, and the total flight time spent in nonstandard configuration.

12.22.4.3. Section III, Flight Profile Data:

12.22.4.3.1. This section allows for four separate cruise periods. Do not enter temporary cruise periods of less than 15 minutes (due to clearance changes, weather, etc.). Entries are required for low-level clean configuration events where a cruise period time and altitude is held longer than 5 minutes at 6,000-feet mean sea level (MSL) or lower. Neither traffic nor the climb or descent portions of the sortie are to be entered. These entries are to be made left-to-right in chronological time sequence as they occur. The first cruise period start time should begin after the initial climb and cruise is stabilized. Cruise period stop times should be entered when one of the following events occur:

12.22.4.3.1.1. Climb or descent in excess of 4,000-feet from recorded altitude is initiated.

12.22.4.3.1.2. Altitude increases by more than 4,000 from the last recorded value. This may occur when multiple step-climbs (less than 4,000-feet each) are performed.

12.22.4.3.1.3. Cruise Mach number is stabilized at 0.10 from the last recorded value.

NOTE:

Climb and descent criteria will normally govern when to close out a cruise period. The Mach number change criteria is possible during aerial refueling operations and turbulence encounters.

12.22.4.3.2. Subsequent cruise periods should begin when Mach/altitude conditions are stabilized. The stop time for the last chronological cruise entry indicates scheduled cruise has ended and descent for landing follows.

***NOTE*:**

Cruise entries are not required if the entire flight remains in the initial takeoff airfield's traffic pattern. (See section II, columns 37-40.) However, a cruise entry will be required when:

12.22.4.3.2.1. The traffic pattern altitude (6,000-feet MSL) is exceeded, regardless of time duration.

12.22.4.3.2.2. Each time an aircraft departs from one base traffic pattern and flies to another base regardless of altitude or time duration.

12.22.4.4. Section IV, Transition Training—Touch-and-go Landings, Additional Full Stops, and Takeoffs.

12.22.4.4.1. Columns 10-11. Sequence number: Keypunch instructions, no entry required.

12.22.4.4.2. Columns 12-55. T&G: There is space to record 22 touch-and-go landings. Enter additional T&Gs in remarks column, if required. Enter the Zulu time at touchdown for each T&G. Enter T&Gs left to right on the first line as they occur. After the 11th T&G entry, begin second line and enter 12th and subsequent T&Gs left to right as they occur. Leave unused portion blank.

Do not skip any entries. Time entries should always be ascending in chronological order (allowance is made for passing through 2400Z).

12.22.4.4.3. Columns 56-59. Full stop: There is space to record two practice full stop landings. Enter additional full stop landings in the *remarks* section. Enter the Zulu time at touchdown for the first practice full stop on the first line. Leave unused portion of section IV blank.

NOTE:

Do not enter practice landings on substandard runways. A new log must be accomplished for each substandard runway practice landing.

12.22.4.4.4. Columns 60-63. Takeoff: There is space to record two additional takeoffs. Enter additional takeoffs in remarks section. Enter the Zulu time at takeoff for the additional takeoffs as they occur. Leave unused portion blank.

12.22.4.5. Section V, In-flight Operations:

12.22.4.5.1. Columns 10-11. Sequence numbers: Keypunch instructions, no entry required.

12.22.4.5.2. Columns 12-16. Event: Place an "X" in the appropriate column.

12.22.4.5.3. Column 12. Terrain Following (TF)/Low Level (LL).**

12.22.4.5.4. Column 13. Aerial Refueling (R).*

12.22.4.5.5. Column 14. Airdrop (A).*

12.22.4.5.6. Column 15. Cargo Jettison (CJ).*

12.22.4.5.7. Column 16. Fuel Jettison (FJ).

*Simulated events will be recorded.

**Usually applies during special operations low level (SOLL) II and tactical VFR training (TVT) sorties. Use LL when flying a clean configuration event at or below 2,000-feet AGL for longer than 5 minutes.

12.22.4.5.8. Columns 17-20. Event start time (Zulu time): For airdrop or cargo jettison, the start time is when the aerial delivery system (ADS) doors start to open. For AR, start time is when the aircraft enters tanker wake turbulence or the aircraft is within approximately 500-feet of the tanker.

12.22.4.5.9. Columns 21-24. Event stop time (Zulu time): For airdrop or cargo jettison, stop time is when the ADS doors are closed. For AR, time ends when the aircraft leaves the tanker wake turbulence or the aircraft is approximately 500-feet from the tanker.

12.22.4.5.10. Columns 25-27. Incremental weight: Enter the weight onloaded or offloaded for the event "X-ed" in columns 12-16. Enter "000" for simulated events.

12.22.4.5.11. Columns 28-31. Altitude or clearance plane setting: Enter the altitude in thousands and tenths of thousands of feet. A decimal point has been provided on the form. For terrain following and low-level, enter the altitude in feet AGL.

12.22.4.5.12. Columns 32-39. Terrain following and low-level: If an "X" was placed in column 12, make the following entries:

12.22.4.5.12.1. Columns 32-33. Route code: Enter the code number of low-level route flown.

12.22.4.5.12.2. Columns 34-35. Mode: Place an "X" in the appropriate column, "A" for automatic, "M" for manual.

12.22.4.5.12.3. Column 36. Ride setting: Enter a "0".

12.22.4.5.12.4. Columns 37-39. Mach: Enter the 3-digit Mach number being flown for terrain following. (Decimal is assumed.)

NOTE:

An altitude entry is required for all events. Columns 17-31 must be completed for each event. Columns 32-39 must be completed for terrain following and low level only. Do not place decimal points in any columns. All allowed decimal points are preprinted on the form.

12.22.4.6. Section VI, Sortie Time and Takeoff Weight Computation:

12.22.4.6.1. Flight Duration:

12.22.4.6.1.1. Landing time: Enter the ending Zulu landing time.

12.22.4.6.1.2. Takeoff time: Enter the initial Zulu takeoff time.

12.22.4.6.1.3. Total time: Enter the total flight time in hours and minutes.

12.22.4.6.1.4. Total time: Enter the total flight time in hours and tenths.

NOTE:

The takeoff and landing time entries in sections II and VI should be identical and should be the same as recorded in the AFTO Form 781 for the sortie being reported. (See paragraph **12.22.1** for exceptions.)

12.22.4.6.2. Takeoff Weight Computation. Complete the takeoff weight computation portion when computing takeoff requirements. The operating weight and cargo, passenger, and miscellaneous weight entries should not change. The fuel weight at brake release is subject to change due to unforeseen delays. The FE need not readjust section VI entries in case of delays. The FE should always enter the corrected fuel weight and gross weight at takeoff in section II.

NOTE:

LN2 weight will be included in the aircraft operating weight.

12.22.4.6.3. Remarks: Enter any appropriate comments that could influence aircraft fatigue factors. Examples are: severe turbulence encountered, hard landing, nonstandard fuel sequence, high load maneuvers, unpressurized flight, and in-flight thrust reverser operation. If active lift distribution control system (ALDCS) is off or inoperative in flight, record the conditions and flight duration. Record the appropriate sequence number from section V, In-flight Operations Data, of any AR event occurring behind the KC-10. ***EXAMPLE:*** "KC-10 A/R, seq XX" where "XX" is the sequence number. Other required remarks are mentioned in the various section instructions.

NOTE:

If all blocks for a specific maneuver are completed and additional blocks are needed, use another AF Form 4097 for continuation. Use same log number and annotate in the remarks section of the continuation form, "Continuation of log number XXXXX."

12.23. AF Form 4054, Performance and Fuel Management Log Instructions. Use T.O. 1C-5A-1-1

and the appropriate information from AF Form 4053, AF Form 4052 (or the common-use AF Form 4091, **Mission Data**).

12.23.1. Use AF Form 4054:

12.23.1.1. On all category I routes and overwater missions.

12.23.1.2. For any flight that is not flown within the parameters used for flight and fuel planning or when the time behind flight plan exceeds 15 minutes. (***EXAMPLE***: Flight and fuel planned for FL 330 step climb profile, but cleared for cruise at FL 290 constant.)

12.23.1.3. On missions that overfly island bases, maintain a fuel management log until final destination is assured. (***EXAMPLE***: Hickam - Wake - Guam.)

12.23.1.4. To compute the "Fuel Onload Confirmation" section on all operational air refueling missions regardless of the routing.

12.23.1.5. When directed by the aircraft commander.

12.23.2. Section I:

12.23.2.1. Zero Fuel Weight (ZFW). Obtain zero fuel weight from the DD Form 365-4, **Weight and Balance Clearance Form F—Transport**.

12.23.2.2. Takeoff (TO) FUEL. Obtain takeoff fuel by adding fuel tank quantities.

12.23.2.3. TO GW. Calculate takeoff gross weight by adding ZFW to T/O FUEL.

12.23.2.4. TEMPERATURE DEVIATION. Use en route temperature deviation (CFP, forecast, or actual), whichever is considered the most accurate.

12.23.2.5. INITIAL ALTITUDE. Confirm initial four-engine cruise ceiling using level-off gross weight and temperature deviation.

12.23.2.6. ENGINE OIL READINGS. Record oil pressure and temperature during first stabilized cruise segment.

12.23.2.7. AIR REFUELING. Before takeoff obtain: BURNOFF BEHIND TANKER from AF Form 4052, block 15 or 36, FUEL REQUIRED AT EXIT from block 31 or 52, and PLANNED TRANSFER from block 19 or 40. Calculate SUBTOTAL by adding FUEL REQUIRED AT EXIT to BURNOFF BEHIND TANKER. Subtract the PLANNED TRANSFER from the subtotal to obtain FUEL REQUIRED AT ARCP. 45 minutes before the ARCP compute ESTIMATED FUEL AT ARCP based on your ETA to the ARCP. Subtract from the SUBTOTAL to obtain REQUIRED TRANSFER. Advise the aircraft commander of the required fuel transfer. AIR REFUELING periods 2 and 3 are completed in the same method if required.

12.23.3. Section II:

12.23.3.1. "A. BEGIN DESCENT TIME." Obtain begin descent time from the pilot.

12.23.3.2. "B. TIME." Record Zulu time of observation.

12.23.3.3. "C. ZFW." Obtain zero fuel weight from DD Form 365-4 or ZFW block above.

12.23.3.4. "D. FUEL REMAINING." Obtain fuel remaining from fuel gauge readings.

12.23.3.5. "E. GW." Calculate actual gross weight by adding FUEL REMAINING to ZFW.

12.23.3.6. "F. ALT/MACH." Record current flight level and mach number. *EXAMPLE*: 350/77.

12.23.3.7. "G. TEMP DEV." Use en route temp dev (CFP, forecast, or actual), whichever is considered the most accurate for the remainder of the flight.

12.23.3.8. "H. PAGE #." Page number in TO 1C-5A-1-1, used to compute time in block I.

12.23.3.9. "I. FUEL ETE." Compute fuel ETE using computation blocks at bottom of form (section III), and record in hours and minutes.

12.23.3.10. "J. ETE BDP/OH or ARCP." Subtract Zulu time from BDT to obtain ETE BDP/OH or ARCP.

12.23.3.11. "K. EXTRA TIME." Subtract ETE BDP/OH or ARCP from FUEL ETE to obtain EXTRA TIME.

12.23.3.12. "L. 4 ENG CEIL." Compute 4-engine cruise ceiling using current gross weight and actual temperature deviation.

12.23.3.13. "M. 3 ENG CEIL." Compute 3-engine cruise ceiling using current gross weight and actual temperature.

12.23.3.14. "N. PILOT'S INITIALS." Pilot will review and initial at least every hour and 20 minutes and may discontinue the form at his or her discretion.

12.23.4. Section III:

12.23.4.1. “FUEL REQUIRED OH or ARCP.” Enter FUEL REQUIRED OH from AF Form 4053 (block 13) or AF Form 4052 (block 56) for airland/final destination or FUEL REQUIRED ARCP from AF Form 4054 section 1 for air refueling missions.

12.23.4.2. “ZFW.” Enter zero fuel weight.

12.23.4.3. “OH GW/TIME.” Obtain OH GW by adding FUEL REQ OH or ARCP and ZFW. Obtain TIME using the applicable TEMP DEV and performance charts in the 1C-5A-1-1.

12.23.4.4. AGW/TIME. Record actual gross weight. Compute TIME using the applicable TEMP DEV and performance charts in the 1C-5A-1-1.

12.23.4.5. FUEL ETE. Subtract AGW/TIME from OH GW/TIME to compute FUEL ETE. Fuel ETE will be recorded in hours and minutes.

Chapter 13

LOADMASTER PROCEDURES

13.1. General. The loadmaster coordinates loading or offloading with air terminal operations or the shipping agency, plans loads, provides in-flight services to passengers, and supervises onloading or offloading operations.

13.2. Responsibilities of Aircraft Loading:

13.2.1. AMC Stations:

13.2.1.1. Aerial port personnel are responsible for selecting cargo and mail for airlift, prompt completion of documentation, palletizing and load planning of palletized cargo, and moving cargo to and from the aircraft to meet scheduled departure. They will advise the loadmaster of destination, size, weight, and type of cargo (classified, hazardous, etc.) to permit proper positioning. Aerial port personnel are responsible for safe positioning of material handling equipment and cargo to or from the aircraft cargo door, ramp, or auxiliary ground loading ramp. Under the supervision of the loadmaster, the load team will prepare the aircraft for loading (stow loading equipment if the aircraft is not to be reloaded), physically load the aircraft, tie down cargo and equipment as directed, release tie down, and physically offload the cargo.

13.2.1.2 The loadmaster is responsible for aircraft pre-flight; load planning cargo and oversized cargo; preparing DD Form 365-4, **Weight and Balance Clearance Form F–Transport**; operating aircraft equipment; supervising and directing loading, offloading and tie down; and coordinating with the loading crew supervisor for checking the cargo against manifests. The loadmaster supervises loading and is responsible for safe movement of cargo into and out of the aircraft.

13.2.1.3. Loads planned by qualified load planners will be accepted by the aircraft loadmaster and loaded aboard the aircraft as planned unless the load or any portion thereof will compromise flying safety or does not comply with the applicable aircraft technical orders or USAF and AMC publications. If cargo is refused or rearranged, forward all applicable information including a copy of the load plan to HQ AMC/DOV, through standardization channels.

13.2.2. At locations without AMC air terminal or traffic personnel, the shipper assumes the responsibilities as described in paragraph **13.2.1.1** and provides sufficient qualified personnel and handling equipment for loading or offloading.

13.2.2.1. Loadmaster responsibilities and authority are the same as described in paragraph **13.2.1.2** and paragraph **13.2.1.3**.

13.2.2.2. During joint airborne air transportability training (JA/ATT), special assignment airlift missions (SAAM), and US Air Force mobility missions, the loadmaster can accept DD Form 2133, **Joint Airlift Inspection Record**, as valid pre-inspection of equipment being offered for air shipment. This form, validated by two joint inspector signatures, may be used in lieu of the applicable portions of T.O. 1C-5A-9Cl-1. The DD Form 2133 will not be used to document preparation of hazardous materials. This will be accomplished using the Shipper's Declaration for Dangerous Goods.

13.3. Emergency Exits and Safety Aisles. There must be a reasonable degree of access to the rear of the airplane and passengers and troops must have ready access to emergency exits. To ensure emergency exits and safety aisles are accessible and usable, the following shall apply:

13.3.1. Cargo compartment paratroop doors and the crew entrance door will be unobstructed and operative when passengers and troops are transported in the cargo compartment.

13.3.2. Ensure that at least one unobstructed safety aisle is available in the cargo compartment to allow movement from the flight deck to the troop compartment. Cargo and loose equipment shall not be stowed on the cargo compartment walkways.

13.3.3. As a minimum, two escape slides, one on each side of the troop compartment, are required when passengers and troops are transported in that compartment. Both the slide and associated exit must meet the following requirements to be considered fully operational:

13.3.3.1. The slide must be capable of pneumatic inflation.

13.3.3.2. Exits must be capable of being opened with reasonable effort.

13.3.3.3. The number 6 service door guides must remain in the tracks and the door must be capable of staying latched in the open position.

13.3.4. Troop compartment capacity is limited to 40 total personnel, including crewmembers, when either #3L or #3R escape hatches are not fully operational. Passengers will not be transported when either the #4 escape hatch or #6 service door is not fully operational.

13.4. Pre-flight Duties.

13.4.1. Cargo Missions:

13.4.1.1. Aerial port personnel establish loading times. Loading times that differ from the normal pre-departure sequence will be established before the cargo loadmaster enters crew rest. Loading time is governed by the type of load and complexity of loading procedures and not by port saturation or management of aerial port workload levels.

13.4.1.2. Proper cargo documentation must accompany each load. A consolidated manifest will be delivered to the aircraft before departure unless one is not available due to a lack or failure of the manifest processing equipment. In this case, a cargo listing or floppy disc containing manifest information must accompany the load.

13.4.1.3. Make every effort to exchange tiedown equipment on a one-for-one basis. If this is not possible, annotate AF Form 4069, **Tiedown Equipment Checklist**. At non-AMC stations, 463L pallets will normally be exchanged on a one-for-one basis.

13.4.1.4. Fleet Service Checklist.

13.4.1.4 .1. Aircrew members will make every attempt to ensure the AF Form 4128, **Aircraft Servicing Checklist**, is placed on the aircraft and signed by the fleet service representative before departure.

13.4.1.4.2. At en route location, annotate the form with the station ICAO or 3 letter identifier over the appropriate block in section II. Example: aircraft departs Dover arrive Ramstein AB, and terminates in Dover. In section II, column 2, enter ETAR (for Ramstein) and the number of items the aircraft arrived with in the appropriate rows. Fleet service will inventory and annotate departure information in column 2, D (departure) block. Fleet service will write station ICAO code, date, print and sign with grade in section I. If at a station with no fleet service, annotate the appropriate block in section I indicating fleet service was not available.

13.4.1.4.3. If inventory changes, make annotations in section III. Place item nomenclature, increase/decrease amounts, station where changes occurred, date and reason why inventory changed.

13.4.1.4.4. If crewmembers notice lost or missing equipment, make every attempt to recover. If unable to recover missing fleet service items, annotate section IV and have aircraft commander sign certification.

13.4.2. Passenger Missions:

13.4.2.1. Manifesting. Aircraft commanders and loadmasters are responsible to ensure that all passengers are properly manifested.

13.4.2.1.1. At locations with an AMC Passenger Processing Activity, passengers are manifested by air terminal or base operations personnel.

13.4.2.1.2. At locations without an AMC Passenger Processing Activity, AMC aircrew personnel will manifest all passengers (use DD Form 2131, **Passenger Manifest**) and leave a copy of the manifest with the flight plan. If not filed with the flight plan, annotate the location of the manifest on the flight plan IAW AFI 11-202V3, Paragraph 3.2.

13.4.2.1.3. When manifesting is accomplished by the aircrew, anti-hijack-process IAW AFI 31-101V1, *Air Force Physical Security Program*, and specific MAJCOM directives.

13.4.2.2. Ensure all food items are removed from aircraft by fleet service and returned to the in-flight kitchen if extended delay occurs. Ensure that a copy of AF Form 129, **Tally In-Out**, is received from fleet service to relieve the loadmaster of meal accountability.

13.4.2.3. Complimentary snacks and beverages are authorized on TWCF funded missions (including missions flown by the 97 Airlift Wing, Air National Guard, and AFRC units). They are for passenger consumption only. Complimentary snacks are not authorized on JA/ATT, Joint Chiefs of Staff (JCS) exercises or SAAMs. Record all unused snacks and beverages on AF Form 129, and return to the in-flight kitchen for turn-in credit.

13.4.2.4. Ensure the APU and ATM are shut down on the side of the airplane used to enplane passengers. (**EXCEPTION**: if passenger buses are parked directly behind the aircraft and passengers will be on/offloaded over the aft ramp, both APUs and ATMs may be operated.) A crewmember or passenger service representative will greet passengers at the bottom of the troop compartment ladder. The troop compartment loadmaster assists in seating passengers. Assure that only adult, English-speaking passengers are seated next to emergency exits. Do not seat children under 15 years old in seat rows where emergency exits are located. Make every effort to seat families together.

13.4.2.5. When children under the age of two are accepted as passengers, their sponsor must provide their own DOT approved Infant Car Seat (ICS). Passengers may hand-carry ICS; these seats will be secured using the seat belt. Adults will not hold ICS during any phase of flight.

NOTE:

Adults will place infants in ICS during all critical phases of flight.

13.4.2.6. Every effort shall be made to transport passengers with disabilities who are otherwise

eligible to travel. Passenger service personnel and crewmembers shall provide assistance in loading, seating, and unloading the disabled passenger. Travel may be disapproved by the chief of the passenger travel section or the aircraft commander if there is unacceptable risk to the safety of the disabled passenger, other passengers or crew, or if operational necessity or equipment or manpower limitations preclude accepting disabled passengers. Such disapproval shall be rare. In such cases, air terminal personnel must ensure the passenger understands why air transport is not possible on the mission in question. When a disabled passenger is denied transportation for these reasons and when his or her sponsor or dependent, who is otherwise eligible to travel, accompanies the disabled passenger to assist in his or her needs, travel shall be approved if such assistance will eliminate the reasons for denying travel.

13.4.2.7. Download the baggage of no-show passengers or those who are removed from a flight. In the case of SAAMs or exercise missions at non-AMC locations, aircraft commanders will work with the TALCE or deploying unit commanders to decide if downloading baggage is necessary.

13.5. Passenger Handling.

13.5.1. The loadmaster is the key figure concerning good passenger relations. There are certain rules that must be observed to help ensure good passenger relations:

13.5.1.1. Address passengers by proper titles.

13.5.1.2. Avoid arguments and controversial subjects, national or international politics, and criticism of other personnel or organizations.

13.5.1.3. Offer services and perform duties in a manner indicating a personal interest and willingness to help.

13.5.2. Comments by the loadmaster and the manner in which they are made often determine passenger attitudes about the flight. At all times, remember that passengers are individuals; address them collectively only when making announcements.

13.5.3. In-flight procedures:

13.5.3.1. Two loadmasters are required in the troop compartment for takeoff, landing, and, if necessary, meal service during all missions with more than 40 passengers.

13.5.3.2. Passengers may move about the troop compartment; however, use good judgment on the number of passengers allowed out of their seats at any one time. Encourage passengers to remain seated with their seat belts fastened.

13.5.3.3. Make frequent checks on the following:

13.5.3.3.1. Cabin temperature.

13.5.3.3.2. Passengers with small children.

13.5.3.3.3. Cleanliness of the troop compartment and lavatories.

13.5.3.4. Do not allow passengers to lounge on or tamper with emergency equipment.

13.5.3.5. On flights of long duration, particularly during hours of darkness, use all possible means to make passengers comfortable. Dim and extinguish unnecessary troop compartment lights.

13.5.3.6. Passengers may visit the flight deck only when approved by the aircraft commander. Use

good judgment when requesting this authority. See **Chapter 5** for appropriate restrictions.

13.5.4. Meal service:

13.5.4.1. When practical, meals are served at normal meal hours, based on the local time at point of departure. Avoid waking passengers to offer meals. Ask the aircraft commander for expected flight conditions before meal preparation.

13.5.4.2. Passengers who have an AMC Form 148, **AMC Boarding Pass/Ticket**, that shows a meal was purchased are served in the following sequence:

13.5.4.2.1. Small children requiring assistance.

13.5.4.2.2. Distinguished visitors (DV).

13.5.4.2.3. All other passengers.

13.5.4.3. Use the following procedures for distributing box lunches:

13.5.4.3.1. After takeoff, distribute box lunches to passengers who boarded at the previous station. This precludes confusion when flight segments are short and passengers board at subsequent stations.

13.5.4.3.2. Ensure each passenger receives the meal ordered by verifying the passenger's Boarding Pass/Ticket.

13.5.4.3.3. When authorized meals have not been furnished to passengers, inform them that they may receive refund at the next station or the destination terminal. The loadmaster will sign the AMC Boarding Pass/Ticket and indicate the meal was not available to the passenger.

13.5.4.4. Do not serve liquids or hot food during turbulence.

13.5.4.5. The recommended routine is to first serve passengers nearest the galley and continue toward the front of the aircraft. This enables the loadmaster to collect empty trays on each return to the galley.

13.5.4.6. Turn-in meals unfit for consumption at the first in-flight kitchen. If in radio contact with the issuing station, relay aircraft tail number, mission identifier, number of spoiled meals (by menu), issuing organization, and, in the case of frozen meals, the manufacturing agency and the manufacturer's lot number.

13.6. Over-Packed Meal Procedures:

13.6.1. Sign for over-packed inflight meals and supplements delivered to the aircraft. These meals have been inventoried and annotated showing the total number of meals in each container. Do not open containers for inventory.

13.6.2. Obtain sufficient blank copies of AMC 305, **Receipt for Transfer of Cash and Vouchers**.

13.6.3. At the onload station, contact the troop commander or other individual responsible for the mission. The unit or the user is responsible for collecting for the meals before onload. Turn the money over to the loadmaster with two separate listings. One listing will contain names of those not on separate rations who are authorized to receive government meal at no charge. The other list will contain names of those on separate rations and who pay for their meals. Both listings must be certified. The loadmaster will count the money to ensure the total is correct and issue a receipt AMC Form 305

to the user.

13.6.4. At en route, remain overnight, or terminating stations, turn-in the money and both listings to the in-flight kitchen. If an in-flight kitchen refuses to accept the money or meals, have the aircraft commander report the name, rank, date, time, and location through channels on Aircraft Commander's Report on Services/ Facilities. (See **Chapter 8** for instructions for processing this form.) In this case, retain the money and meals and turn them in to the next available AMC in-flight kitchen. When a crew change occurs and the money or meals are transferred to the outbound loadmaster, the inbound loadmaster will retain the signed receipt as proof of money or meals transfer.

13.7. En Route and Post-flight Duties.

13.7.1. At stations where a crew change is made and loading or offloading is required, the inbound loadmaster is responsible for offloading the aircraft. The outbound loadmaster is responsible for planning and loading the outbound load. When no crew change occurs, the inbound loadmaster is normally responsible for offloading cargo on arrival and uploading cargo on departure.

13.7.2. Assist passengers to deplane. If BLUE BARK, DVs, COIN ASSIST, or couriers are aboard, the loadmaster informs the traffic representative.

13.8. Emergency Airlift of Personnel. The following procedures will apply to ensure a safe, efficient loading method for the emergency airlift of personnel and aeromedical evacuation (AE) of litter patients from areas faced with enemy siege or hostile fire, for humanitarian reasons, or when directed by MAJCOM/DO through CCC.

13.8.1. Emergency airlift of personnel will normally be accomplished without the use of individual seats or seat belts. Evacuees will be seated on the cargo compartment floor and restrained with tiedown straps. Approximately 600 evacuees can be transported in this configuration, but can vary depending on individual sizes. Loading procedures and actual placement of evacuees will be determined by the loadmaster and aircraft commander.

13.8.2. See **Chapter 20** for procedures pertaining to AE of medical patients.

13.8.3. Maximum altitude for emergency airlift of personnel is FL 250.

13.9. Soldier Rucksacks. The following procedures will be used for units that deploy with rucksacks:

13.9.1. During tactical deployments into a forward operating base (FOB) or objective base (OB), the individual will carry rucksacks onto the aircraft. Allocate floor space on the aircraft load plan for floor loading rucksacks.

13.9.2. During administrative deployments, rucksacks will be loaded on deploying vehicles, palletized, or floor loaded.

13.9.3. In all cases, load rucksacks on the same aircraft as the individual.

13.10. Loaded Weapons. Weapons are considered loaded if a magazine or clip is installed in the weapon. This applies even though the clip or magazine may be empty.

13.10.1. Personnel who will engage an enemy force immediately upon arrival (actual combat) may carry basic combat loads on their person. Weapons will remain clear with no empty or full magazines or clips installed until immediately before exiting the aircraft.

13.10.2. Personnel who will not immediately engage an enemy force (to include exercises that simulate

engagement of an enemy force) will store their basic ammunition loads in a centralized location for redistribution on arrival at their objective. Magazines or clips will not be inserted into weapons.

13.11. Cargo Validation Onloading and Offloading Procedures. In order to assist in the validation process, a cargo validation onloading and offloading format has been designed. Use this format when tasked to validate a new piece of equipment or when encountering any cargo that requires special or specific onloading or offloading procedures that are not currently listed in TO 1C-5A-9-2. After completion, process through standardization channels to HQ AMC/DOV.

13.11.1. General Loading Data:

13.11.1.1. Nomenclature or item (Give the military or civilian name, national stock number [NSN], and a brief description of the item, i.e. dump truck, medical van, etc.)

13.11.1.2. Dimensions (in inches):

13.11.1.2.1. Length, width, and height.

13.11.1.2.2. A rough drawing or picture of the unit, pointing out critical dimensions, projections, overhangs, etc.

13.11.1.2.3. Weight (in pounds):

13.11.1.2.3.1. Gross weight.

13.11.1.2.3.2. Individual axle weight.

13.11.1.2.3.3. Data plate weight if applicable.

13.11.2. Loading Crew Personnel (Number of loading crew personnel and loadmasters required to onload or offload cargo and their required position to observe clearance if required.)

13.11.3. Equipment and Material Requirements (Special equipment and material required to onload and offload cargo, i.e., cargo winch, prime mover, shoring requirements.)

13.11.4. Aircraft Configuration.

13.11.5. Preparation of Cargo for Loading (Helicopter struts, components that must be removed, etc.).

13.11.6. Loading Procedures.

13.11.7. Tiedown Points and Locations.

13.11.8. Offloading Procedures.

13.12. Weight and Balance. Accomplish weight and balance for the C-5 aircraft according to T.O. 1-1B-50 and Addenda A to this AFI. The unit possessing the airplane maintains the primary weight and balance handbook containing the current airplane status and provides a supplemental weight and balance handbook for each airplane, according to T.O. 1-1B-50. Enclose the supplemental handbook in a wear resistant binder (preferably metal), stenciled "Weight and Balance" with the airplane model and complete serial number on the cover.

13.12.1. The supplemental handbook will include the loading data manual, addendum A, sufficient copies of DD Form 365-4 and a certified copy of the current DD Form 365-3, **Chart C- Basic Weight and Balance Record**. The chart "C" will include the airplane's basic weight, basic moment, and center

of gravity.

13.12.2. The weight and balance section of the unit possessing the airplane will provide the information required to maintain documents current and accurate to the appropriate agency (as directed by wing policy).

13.12.3 Obtain the total fuel weight from the flight engineer or read directly from each gauge and compute the sum total fuel weight.

13.13. Flight Station and Troop Compartment Access. During loading operations, do not place cargo in a position that will restrict the use of the flight station or troop compartment stair ladders during flight.

Chapter 14

FUEL PLANNING

14.1. General. In conjunction with AMCPAM 11-2, *C-5 Fuel Planning*, this chapter provides fuel planning policy and procedures for C-5 operations. It is designed to assist aircrews in fuel planning for airland, low level, and air refueling missions.

14.2. Scope. The provisions of this chapter apply to all AETC, AMC, and Air Reserve component (ARC) personnel responsible for C-5 fuel planning.

14.3. Distribution. Distribute this chapter to all personnel responsible for flight and fuel planning of airlift missions. Maintain this chapter in AMC Command Posts and AMC airlift coordination centers.

14.4. General Planning. Aircrews will fuel plan using AMCPAM 11-2. Normal cruise speed for the C-5 is 300 KCAS/.77 M, whichever is less. Use Fuel Planning requirements in **Figure 14.1**.

Figure 14.1. Fuel Planning Requirements.

Start, Taxi, Run-Up, APU, and Takeoff	3,000	When more than 15 minutes taxi time is anticipated, add 120 pounds per minute, not to exceed 5,000 pounds total.
En Route		Fuel for flight time from departure to begin descent point (BDP) at cruise altitude profile.
En Route Reserve		10 percent of flight time fuel over a category I route/route segment, not to exceed 1+00 fuel at normal cruise.
Alternate		Fuel for flight time from OH destination to alternate, or to most distant alternate when two are required, at the speed and altitude from the alternate fuel chart. Compute using OH destination GW (takeoff GW minus blocks 3, 7a, and missed approach fuel, if applicable).
Missed Approach	8,000	Required if destination is below ceiling minimums, but at or above visibility minimums.
Holding		+45 fuel computed from holding chart. When an alternate is unavailable, located in Alaska, or at latitudes greater than 59 degrees, use 1+15. Compute using OH alternate GW (takeoff GW minus blocks 3, 4 and 7a).
Descent, Approach, and Landing	7,000	When manually flight planning, add 15 minutes and 5000 pounds of fuel to fuel overhead destination for approach and landing.
Known Holding Delays		Computed from holding chart for expected duration of holding.
Off Course Maneuvering	600/min 400/min	**Departure**. Terrain clearance, thunderstorm avoidance, and air traffic control (ATC) requirements.**Cruise**. Thunderstorm avoidance and ATC requirements. ***NOTE***: In both cases, compute fuel based on anticipated increase in flying time not time spent maneuvering off course.
Insufficient and Unreliable NAVAIDs	5,000	At destination airfield
Engines Running Onload and Offload	100/min	
Hydraulic Cooling		Plan to land at destination with minimum of 18,000 pounds to comply with requirements of TO 1C-5A-1. If block 13 of AF Form 4115 (block 56, AF Form 4053) is less than 25,000, add fuel to block 7b (block 51, AF Form 4053) equal to the difference between block 13 or (block 51, AF Form 4053) and 25,000. For in-flight diversions and fuel management, only block 13 (block 51 on AF Form 4053) fuel is required.

Subsequent Mission Segments		Add fuel when unavailable at en route stops, compressed ground times during single day, multi-sortie missions preclude refueling, or if en route refueling would delay or be detrimental to mission accomplishment. Fuel tankering merely for convenience is not authorized. ***NOTE***: When deemed financially prudent by the aircrew or mission planners, aircrews may tanker fuel when transiting airfields without DoD or DoD contract fuel. The decision to tanker fuel should be based on careful analysis of mission requirements and limiting factors.
NOTE**:** Fuel figures are in pounds		

14.4.2. Fuel requirements are in **Figure 14.1**. If decompression would cause descent to an altitude resulting in fuel consumption exceeding planned fuel, add fuel to recover at a suitable airfield from equal time period (ETP) at the appropriate altitude using guidance in AMCPAM 11-2. This is not required if the aircraft can recover to a suitable airfield at FL 250 at long range cruise (LRC) speed from ETP.

14.4.3. Fuel Conservation. Conservation of fuel requires active participation at all levels. If actual ramp fuel exceeds required ramp fuel load (RRFL) by more than 5,000 pounds, the aircraft commander will notify the local controlling agency and request defueling assistance. If defueling is not practical due to time constraints or lack of support equipment and personnel the aircraft commander may elect to depart with the extra fuel.

14.4.4. Fuel Loads:

14.4.4.1. Canned fuel loads will not be used and final servicing will be delayed until accurate fuel requirements are known.

14.4.4.1.1. Aircraft do not require defueling if the fuel load is 60,000 pounds or less.

14.4.4.1.2. Standard ramp fuel loads as established and approved by HQ AMC/DOV, HQ AFRC/DO, or ANG/DO as appropriate, are authorized for home station departures.

14.4.4.2. Units will not plan locals with fuel loads exceeding 220,000 pounds. Use the minimum fuel load necessary for training and airframe utilization requirements. Plan to terminate local missions with not less than 20,000 pounds.

14.5. A/R Fuel Planning. Use AF Form 4052, **C-141/C-130/C-5/C-17 Refueling Computations**. A discussion of A/R fuel planning can be found in AMCPAM 11-2.

14.6. Variant Configuration Fuel Planning. The following procedures were developed to standardize fuel planning for variant configurations.

14.6.1. Estimate the flying time for the configuration you have.

14.6.1.1. Use the calibrated airspeed/mach limit from Section V for the configuration you have and convert it to a true airspeed (TAS) using T.O. 1C-5A-1-1, Figure A1-7 (enter the chart at 25,000-feet).

14.6.1.2. Use the average forecast wind factor (FWF) from the CFP to convert the TAS to ground speed (GS).

14.6.1.3. Apply the ground speed to the total distance remaining to arrive at the total time en route.

14.6.2. Estimate a takeoff gross weight using the following:

14.6.2.1. Flights with a **drag index less than 150** or a takeoff gross weight less than 550,000 pounds.

14.6.2.1.1. 30,000 pounds per hour for the first hour.

14.6.2.1.2. 25,000 pounds per hour for remaining flight time.

14.6.2.1.3. Determine your category I leg reserve fuel:

14.6.2.1.3.1. Cat I Leg Reserve Fuel = $\frac{(25{,}000 \text{ pounds})(\text{reserve time in minutes})}{(60 \text{ minutes})}$

14.6.2.1.4. Alternate fuel: 25,000 pounds per hour.

14.6.2.1.5. Holding fuel: 15,000 pounds.

14.6.2.1.6. Approach and landing: 7,000 pounds.

14.6.2.1.7. Start, taxi, and takeoff: 3,000 pounds.

14.6.2.2. Flights with a **drag index greater than 150** or a takeoff gross weight greater than 550,000 pounds.

14.6.2.2.1. 35,000 pounds for the first hour.

14.6.2.2.2. 30,000 pounds per hour for remaining flight time.

14.6.2.2.3. Determine category 1 leg reserve fuel:

14.6.2.2.3.1. Category I Leg Reserve Fuel = $\frac{(30{,}000 \text{ pounds})(\text{reserve time in minutes})}{(60 \text{ minutes})}$

14.6.2.2.4. Alternate fuel: 30,000 pounds per hour.

14.6.2.2.5. Holding fuel: 20,000 pounds.

14.6.2.2.6. Approach and landing: 7,000 pounds.

14.6.2.2.7. Start, taxi, takeoff: 3,000 pounds.

14.6.3. Using estimated gross weight, obtain a performance ceiling from T.O. 1C-5A-1-1, figure A4-17.

14.6.4. Determine the optimum range airspeed and compare it to section V limits. Use the lower of the two.

14.6.5. Convert the calibrated airspeed/mach to a true airspeed using T.O. 1C-5A-1-1, figures A1-6 and A1-7.

14.6.6. Use the forecast wind factor to determine an average ground speed.

14.6.7. Determine the air distance for the entire route.

14.6.7.1. Air Distance = $\frac{(\text{ground distance})(\text{true air speed})}{(\text{ground speed})}$

14.6.8. Obtain a climb range and climb fuel from TO 1C-5A-1-1, figures A4-5 and A4-6, and correct for variant configuration.

14.6.9. Subtract the climb range from the total air distance.

14.6.10. Determine the en route fuel requirement using TO 1C-5A-1-1, figures A5-7 through A5-21, and correct for variant configuration.

14.6.10.1. Fuel Required = $\frac{(1{,}000)(\text{air distance})}{(\text{air nautical miles per 1000 pounds of fuel})}$

14.6.11. Determine the Category I fuel reserve. (See step 14.6.2.1.3.1 or 14.6.2.2.3.1)

14.6.12. Compute alternate fuel using step 14.6.6, 14.6.7, and 14.6.10 procedures.

14.6.13. Obtain a holding fuel from TO 1C-5A-1-1, figure A6-4, and correct for variant configuration.

14.6.14. Approach and landing fuel: 7,000 pounds.

14.6.15. Start, taxi and takeoff: 3,000 pounds.

NOTE:

This procedure requires the use of estimates to get started. The estimates are general and were developed to cover a wide range of situations. Consequently, you may need to run the procedure twice to refine the fuel load.

14.7. Low-Level Fuel Planning. Charts and procedures are published in AMCPAM 11-2. Low-level mission fuel planning will be accomplished on AF Form 4050, **Tactical Mission Fuel Planning (C-5)**.

Chapter 15

AIR REFUELING (A/R)

15.1. General. A/R procedures are in T.O. 1-1C-1 and T.O. 1-1C-1-23 and this chapter.

15.2. Briefings. Expand normal departure briefings required by **Chapter 6** and **Chapter 9** to include unique mission details. As a minimum, the unit or the aircraft commander will brief:

15.2.1. ALTRV and A/R track details.

15.2.2. Cell operations.

15.2.3. Number of refuelings, tankers, and onload requirements.

15.2.4. Tanker and receiver call signs.

15.2.5. Type of rendezvous and A/R control times.

15.2.6. Refueling altitudes and block altitudes.

15.2.7. A/R abort point (BINGO) point, if applicable.

15.2.8. Recovery airfields and emergency airfields.

15.2.9. Emergency boom latching approval.

15.2.10. Emergency procedures.

15.3. Cell operations. Any modification to T.O. 1-1C-1-23 C-5 cell or mixed C-5 and tanker cell operations requires prior approval from HQ AMC/DOV or MAJCOM Stan/Eval.

15.4. Turbulence. Do not launch if severe turbulence is forecast on the refueling track. Terminate refueling if moderate turbulence is encountered.

15.5. Altitude Reservations (ALTRV). A/R operations are normally flown on tracks or anchor areas published in the DoD Flight Information Publication (FLIP). However, missions or operational considerations may require A/R operations not published in FLIP using an ALTRV.

15.5.1. General:

15.5.1.1. ALTRVs may include all, a portion, or portions of the route.

15.5.1.2. Aircraft operating on an ALTRV must operate within the altitude, time, and areas specified. If not, the ALTRV will be canceled by ATC.

15.5.1.3. The mission must be airborne within a certain time period. The end of this period is the assigned void time (AVANA). This ensures separation between aircraft. Unless otherwise specified, AVANA is 30 minutes after ALTRV published departure time.

15.5.1.4. If a mission is delayed beyond AVANA, rescheduling normally is by 24-hour increments based on the original departure time. It may be less, provided the central altitude reservation function (CARF) and affected ATC agencies concur.

15.5.1.5. An ALTRV does not preclude ATC from using ALTRV airspace provided standard separation is applied between all aircraft.

15.5.2. ALTRV Format. The approved message will contain:

15.5.2.1. Mission code designator, nickname, as required.

15.5.2.2. Unit voice call sign.

15.5.2.3. Number and type of aircraft and equipment suffix (transponder code).

15.5.2.4. Point of departure and destination.

15.5.2.5. Route of flight, including altitude and departure procedures (standard instrument departure, name or number).

15.5.2.6. Cumulative elapsed control times.

15.5.2.7. Climb, descent, compress, expand, and level-off points.

15.5.2.8. Direction of turns.

15.5.2.9. Estimated time of departure (ETD).

15.5.2.10. Cell identification.

15.5.2.11. Interval between aircraft (ADMIS).

15.5.2.12. AVANA time if more or less than 30 minutes.

15.5.2.13. TAS for cruise, AR, and low level.

15.5.2.14. Unit call sign of supporting tankers.

15.5.2.15. Military assumes responsibility for separation of aircraft (MARSA) information.

15.5.2.16. Air defense radar information.

15.5.2.17. Individual flight-planning-from-this-point (IFPFP) information requested from ARTCs on leaving the ALTRV.

15.5.2.18. Any special equipment aboard aircraft or any limitations of navigational equipment or communication capability.

15.5.3. Filing.

15.5.3.1. An ALTRV approval includes a complete description of the route, including altitudes to be flown. When filing a DD Form 175, you do not need to repeat this in the route of flight portion of the flight plan. Instead, place the ALTRV name (e.g., PHOENIX BOOM 2N3/6) in the route of flight block of the DD Form 175. When filing a DD Form 1801, the route of flight information is repeated in the route of flight block. Place the ALTRV name under RMK in block 18.

15.5.3.2. If the ALTRV is from departure to destination, no other information is required to describe the route of flight. However, if the ALTRV is to a point short of destination, the route of flight after the ALTRV must be identified on the flight plan even though the ALTRV approval includes a requested routing from the end of the ALTRV. To complete the route of flight portion of the flight plan, identify the ALTRV as before, immediately followed by end ALTRV coordinates or fix, and a subsequent route description.

15.6. Fuel Planning:

15.6.1. Premission planning. See **Chapter 14**.

15.6.2. In-flight fuel planning. The flight engineer, using AF Form 4054, **Performance and Fuel Management Log**, procedures will make the following A/R fuel computations:

15.6.2.1. Recovery fuel confirmation. After reaching the cruise altitude and before A/R, estimate the fuel on board at the ARCP and compare this with "Required at ARCP" fuel to ensure recovery capability from the ARCP.

15.6.2.2. Fuel onload confirmation. Approximately 45 minutes before each ARCP, complete the fuel onload requirement to ensure sufficient fuel is obtained from the tanker.

15.7. Life Support Requirements—Personnel Advisory Signs. All personnel will comply with advisory signs. Instructor or evaluator pilots may make exceptions to seat belt advisories for crew training purposes only.

15.8. Night AR Requirements:

15.8.1. The tanker must be equipped with a tail mounted floodlight.

15.8.2. KC-135s must have operative boom nozzle light.

15.8.3. At least one A/R receptacle floodlight should be operative. Night refueling with inoperative AR receptacle floodlights is strictly at the boom operator's discretion.

15.9. Emergency Boom Latching. Use of this procedure is limited to bona fide fuel emergencies, contingencies, or as authorized by the mission directive.

15.10. A/R Qualification Training. A/R training will not be conducted with both the receiver pilot and tanker pilot or boom operator in student status. The following procedures apply:

15.10.1. Tanker units will assure that only fully qualified pilots and boom operators operate the boom controls when a student or unqualified receiver pilot is at the controls during AR.

15.10.2. Student boom operator qualification and requalification training will be conducted with an AR-qualified pilot at the controls.

EXCEPTION: CCTS operations at Altus AFB may conduct training with both the receiver pilot and tanker pilot or boom operator in student status provided all students are under direct instructor supervision.

15.10.3. For receiver pilot initial qualification or requalification, the receiver instructor pilot will be in one of the pilot seats with immediate access to the controls through all phases of the rendezvous, refueling, and common flight route.

15.10.4. Before reaching pre-contact position, tell the tanker crew if the aircraft will be flown by a student pilot.

15.10.5. If a change of pilot control is made, the receiver aircraft will move back to at least the pre-contact position, except under the following circumstances:

15.10.5.1. Immediate assumption of control by the instructor pilot.

15.10.5.2. When transferring control between an instructor pilot and a student pilot while

demonstrating the proper techniques to be used in the refueling envelope.

15.10.6. If a receiver seat change takes place, move back to at least 100-feet in trail of the tanker and to a point where the receiver pilot can maintain visual contact with the tanker until the seat change is completed. Before reaching the pre-contact position, the receiver instructor pilot will again tell the tanker crew if the receiver will be flown by a student pilot.

15.10.7. When refueling behind a KC-135, tanker disconnect capability must be demonstrated. Request the KC-135 boom operator to initiated disconnect before conducting a limit demonstration or a practice emergency separation from the contact position.

15.11. A/R Command and Control. A/R missions require close coordination. Aircrews will pass the following information to the TACC or appropriate ANG or AFRC C2 agency:

15.11.1. When departing a base without an AMC command and control center, include as a part of the required departure message (see paragraph **2.6.5**.) an estimated time of arrival (ETA) to the ARCP if it differs by more than 15 minutes from the planned ARCT.

15.11.2. After refueling, report the following if applicable:

15.11.2.1. A/R incomplete.

15.11.2.2. Any significant occurrences.

15.11.2.3. ETA to the next ARCP if it differs by more than 15 minutes from the planned ARCT.

15.11.3. See paragraph **2.6.6**. for additional A/R reporting requirements.

Chapter 16

COMBAT MISSION PLANNING (N/A ANG)

16.1. General. Airlift crews must be capable of employing a wide range of tactics when operating in hostile areas. This chapter provides basic combat mission planning guidance for planners and aircrew standardizing procedures for planning, briefing, and reviewing all missions. Mission planning is normally conducted at least one day before the mission. Operations group commanders may elect to use a "same day mission plan" option. The aircrew is ultimately responsible for the accuracy of the mission materials. Unit mission planning facilities should possess essential mission planning material.

16.1.1. References. See **Attachment 1**.

16.1.2. Combat Mission Planning. Planners must thoroughly study en route threats, terrain, ingress and egress routes, target areas, operations and communications security (OPSEC and COMSEC), political and cultural characteristics, climatology, and any other factors which enhance mission success. The level of coordination is dependent on available time and means of communication. Aircrews must be ready to operate in the joint arena with little or no face-to-face coordination.

16.1.2.1. Concept of Operation. Joint airborne operations will be initiated by a unified or Joint Force Commander (JFC). When an airborne operation is necessary, the JFC ordering the operation furnishes participating units with an initiating directive or Operations Order (OPORD). This directive specifies the missions, outlines the command structure, identifies participating ground and air forces, lists supporting forces, and provides a schedule of events based on the ground tactical plan and available airlift capabilities.

16.1.2.2. Mission Feasibility Study. Prior to specific tasking and detailed mission planning, a preliminary study must be done to develop mission profiles and determine the potential for mission success. Feasibility studies are usually done at the joint command level but may be delegated as low as the individual aircrew. AMCP 55-25, *Tactical Mission Considerations,* contains an outline of considerations to help determine if a mission can be executed as requested.

16.1.2.3. Mission Tasking. In peacetime, National Command Authority (NCA), Joint Chiefs of Staff (JCS), or theater commanders could provide contingency tasking. During declared hostilities, theater commanders or a Joint Task Force (JTF) will task theater airlift missions. The Joint Forces Air Component Commander (JFACC), through the Director of Mobility Forces (DIRMOBFOR), operationally or tactically controls theater airlift forces. The Air Mobility Element (AME) is the centralized point of contact to the theater Air Operations Center (AOC) for airlift mission tasking, support coordination, and mission execution. The AME, in conjunction with the TACC and AOC, normally plans missions and coordinates support. For large tactical operations, detailed mission planning may be delegated to subordinate units and aircrews. All mission planning actions will be coordinated through the AME. The AME is the focal point for theater tasking, coordination, and execution.

NOTE:

This may be accomplished through the TACC for Direct Delivery Missions.

16.1.2.4. Mission Planning Staff. The planning staff should include, as a minimum, the mission commander, a pilot, a navigator, a loadmaster, and a plans/tactics/intelligence expert. Other staff functions such as weather, airspace management, communications, logistics, aerial port and combat

control may also be required.

16.1.3. Mission Planning Folders (MPF). Combat mission planning folders contain essential operational and intelligence data required to plan, study, and execute airlift operations. MPFs should be developed and used for peacetime training and wartime tasking. They also provide a historical record for subsequent mission planning. AMCP 55-25, *Tactical Mission Considerations,* contains a standardized MPF format which may be modified to fit specific tasking. Local forms are authorized.

16.1.4. AMC Mission Commander. See **Chapter 2** for mission commander requirements and qualification criteria. AMCP 55-25, *Tactical Mission Considerations,* contains a mission commander's checklist which is intended to assist mission commanders with their duties and responsibilities.

16.2. Mission Planning:

16.2.1. Operational Missions. Staff planners should prepare detailed master flight plans to meet the requirements of the OPORD/tasking. Flight plans based on a "planning forecast" should be reviewed before the mission is flown, using an "operational forecast."

16.2.1.1. As a minimum, prepare the following items as they apply to the mission:

16.2.1.1.1. Flight plans, maps, charts, and applicable forms.

16.2.1.1.2. Copies of OPORD/tasking.

16.2.1.1.3. Communication and EMCON requirements.

16.2.1.1.4. Air refueling data.

16.2.1.1.5. Tactics and procedures to be employed.

16.2.1.2. The preparing staff agency should provide complete and accurate data. Packages should be annotated to include who prepared the package.

16.2.2. Training Missions. Unit staff will determine who plans the mission.

16.2.3. Mission Support. Planners need to identify, request, and coordinate additional combat mission support above that provided in the OPORD and air tasking order (ATO)/special instructions (SPINS) (i.e., joint suppression of enemy air defenses (J-SEAD), Airborne Warning and Control System (AWACS), airborne battlefield command and control center (ABCCC), etc.). The point of contact for coordination is the AME and the DIRMOBFOR staff.

16.2.3.1. Airlift Support Forces Coordination. Ensure airlift and supporting forces have coordinated the following information:

16.2.3.1.1. Airlift and support forces takeoff times.

16.2.3.1.2. Rendezvous location, altitude, and times.

16.2.3.1.3. Courses of action if airlift is late.

16.2.3.1.4. Course of action if support elements are late.

16.2.3.1.5. Airlift ingress and egress routes.

16.2.3.1.6. TOT/TOA and drop zone (DZ)/landing zone (LZ) (including alternates).

16.2.3.1.7. Call signs.

16.2.3.1.8. Radio frequencies, radio silence procedures, chattermark procedures, and authentication procedures.

16.2.3.1.9. Method(s) support aircraft will use to transmit threat warnings.

16.2.3.1.10. Areas of ground CAPS and EW support coverage (including times of coverage).

16.2.3.1.11. Communication with AWACS.

16.2.3.1.12. Electronic warfare support procedures (if any).

16.2.4. Mission Considerations. There is no single, best solution to any tactical situation. The most important concept in developing tactics is to remain unpredictable. Tactical planning must be ingenious and dynamic, while continuing to use sound tactical concepts developed and tested in the past.

16.2.4.1. Enemy Defenses. Avoiding enemy defenses is a key mission planning factor. The most critical intelligence factors will be the location, capabilities and limitations of the enemy's Order of Battle (OB). Detection may provide the enemy enough warning to deny the objective and direct air defense forces against friendly aircraft.

16.2.4.1.1. Aircraft can be detected by visual, radar, electronic, and noise signatures. Plan the flight at the highest altitudes that deny detection.

16.2.4.1.2 Threat Engagement. MCM 3-1, Volume I (S), *General Planning and Employment Considerations*, provides classified threat system information. If a mission is likely to encounter a hostile air defense environment, evaluate threat capabilities and limitations with intelligence personnel.

16.2.4.2. Force Requirements. Planners must provide all support elements (combat air patrol (CAP), Wild Weasel, etc.) with the general route, timing, and TOT. Defense suppression and counter-air forces can use this information to seek out and engage enemy defense forces that could pose a threat to the mission. Medium-altitude corridor tactics require more dedicated support, such as brute-force electronic countermeasures (ECM), chaff corridor, and extended counter-air suppression efforts.

16.2.4.3. Navigation. Accurate navigation is crucial. Aircrews must plan to use every resource at their disposal. Carefully evaluate the enemy's capability to detect NAVAID emissions from the aircraft, and plan to navigate without this equipment. On all missions, dead reckoning, map reading, and position awareness are crucial to low-level navigation.

16.2.4.4. Altitude Selection. Selected flight altitude is one of airlift's primary defensive tactics. In a sophisticated air defense network, the lower the aircraft altitude, the lower the probability of detection and engagement. Lower altitude reduces slant range on small arms and anti-aircraft artillery (AAA) systems and may place trees and hills between the aircraft and the threat. The newer tactical surface-to-air missile (SAM) systems are capable of attacking targets below 300 ft AGL, so aircrews must be prepared to go to a minimum combat altitude (MCA). In an unsophisticated air defense network having little or no radar coverage, high altitude may be used to avoid small arms, light AAA, and man portable missiles. Plan optimum flight altitudes as high as the threat will allow.

16.2.4.4.1 Minimum Combat Altitude (MCA). MCA is the lowest altitude an aircrew can descend to when they detect or suspect a threat. It is dependent on individual aircrew capabilities, experience level, fatigue factors, terrain clearance, etc. Since maneuvering and navigation capabilities are virtually negated at MCA, descending to this altitude is only warranted as a defensive response to an engaged threat and only for the duration of immediate threat activity. Also

see AMCMAN 11-211 (S), *Tactical Employment, C-5, C-17 and C-141*, paragraph 8.2.1.4.

16.2.4.4.2. Low Altitudes (300' to 500' AGL). Aircraft flying at 500-feet or below may degrade or eliminate a threat system depending on terrain and distance. For airlift aircraft, this altitude range provides optimum terrain clearance for aircraft maneuverability and navigation while countering hostile air defense threat systems. When faced with known threats, every effort must be made to destroy or neutralize them before employing airlift aircraft. Ground controlled intercept (GCI) guided air-to-air engagements will be nearly impossible at low altitudes due to GCI radar limitations and the inability of air interceptors to locate target aircraft and engage air-to-air missiles due to terrain background clutter. Low altitude also reduces an aircraft's infrared (IR) signature; the lower the altitude, the closer the IR SAM must be to detect the IR radiation. Head-on capabilities of cooled seeker heads are degraded by reducing forward IR signature.

16.2.4.4.3. Middle Altitudes (500' to 5000' AGL). Middle altitude range is the worst threat environment for airlift aircraft because all threats are effective at these altitudes and evasive maneuvers are usually ineffective.

16.2.4.4.4. High Altitudes (5000' AGL and above). High altitude range may negate the small arms threat and decreases the effectiveness of most AAA; however, it dramatically increases the vulnerability to enemy fighter or radar SAM attack and places the aircraft in the worst position to begin evasive maneuvers.

16.2.4.5. Day Versus Night Operations. Night operations degrade optically sighted threat systems and increase the probability that enemy defenses may be in a lowered state of readiness. The disadvantages to night operations are that navigation may be more difficult and, if night vision goggles are not used, the aircraft may be forced up to an altitude where radar tracking is more likely. Additionally, when selecting employment options, consider moonlight which may provide sufficient light for optical threat systems and cockpit/cabin lighting which may increase the probability of acquisition by enemy night vision devices.

16.2.4.6. Rules of Engagement (ROE). ROE are directives issued by competent military authority which delineate the circumstances and limitations of combat engagements with other forces encountered. Examples: no-attack areas, free fire zones, aircraft identification requirements, sanctuaries, buffer zones, etc. ROE may be established due to political considerations or tactical restrictions. Aircraft not complying with ROE may be engaged by friendly forces. Plan to avoid buffer zones and sanctuaries, and plan tactics which emphasize an aggressive lookout doctrine.

16.2.4.7. Command, Control and Communications. Tactical airlift missions usually follow a sequence of events which affect future missions. Completion of drops, landings, and securing airfields are but a few of the events command and control may need to track. Secure communications and communications counter-measures will be used to the maximum extent possible because radio transmissions in a combat zone can compromise the aircraft's position and the operational security of the objective. Missions should be planned to use minimum radio communications with transmissions made by exception only. Normally, a communications plan or communications and electronic operating instructions (CEOI) will be provided by the user to define communications requirements. In most cases, code words define events and are transmitted when the event occurs or does not occur (through the use of an execution checklist). Radio contact with the DZ should be limited to that required for safety (i.e. ATC directions, range clearance, unsafe surface conditions, and mission changes). DZ winds or other information may be broadcast in the blind at pre-coordinated times prior

to the scheduled TOT. AMCP 55-25, *Tactical Mission Considerations,* provides a guide for communication considerations during planning.

16.2.4.8. Tactical Deception Planning. Tactical deception is an effective way to mask the mobilization, movement or objectives of friendly forces, protect them during ingress or egress, multiply or hide them. Airlift can be solely a beneficiary of the deception or may be tasked to act as part of an overall plan. Effective deception is executed jointly and must be considered early in the operational planning process. Tactical surprise and deception enhances combat capability but will not be a condition for its success. Deception tactics are limited only by the imagination of the planner, the enemy's ability to react to the deception, and available resources.

16.2.4.9. Time Control. Select control times without using either extremes of the airspeed envelope to allow maximum flexibility for gaining or losing time. This does not preclude planning high speeds as a tactic to reduce threat exposure time or low speeds to enhance terrain masking or reduce turn radius. Building one or more timing triangles or orbit areas into the route prior to the objective area is one method of time control; however, factors such as airspace management, weather, terrain, and threat location must be thoroughly evaluated. Another technique is building a route with optional "timing legs" designed to gain or lose time by cutting corners or extending legs without requiring aircraft to loiter in a defined area and increasing the probability of detection. Regardless of the technique used, the mission must have a briefed time control plan.

16.2.4.10. Airspace Management. Successful employment of airlift in a combat zone demands close coordination and integration with theater airspace managers (including allies). Airspace control requirements will vary depending upon the area or zone of the theater, but are generally more intense and critical the farther forward aircraft are employed in the combat zone. The AME/TACC Airspace Management Branch is responsible for providing this information. Essential airspace management consideration are discussed in AMCP 55-25.

16.2.4.11. Evasion Plan of Action (EPA). Aircrews and/or planners with the assistance of intelligence personnel and life support/survival specialists, will develop an EPA. An evasion plan may be included in the OPORD or SPINS. AMCP 55-25 includes suggested EPA planning information.

16.3. Tactics Briefing. The mission briefing presented by the mission planners will normally be conducted no earlier than three days before the mission. The purpose of the mission briefing is to acquaint all crewmembers with the general aspects of the mission. The group or squadron commander, combat support group staff specialists, all crewmembers of each participating crew, and other personnel concerned with the mission should attend. The mission briefing may include all information pertinent to the mission and eliminate the need for later specialized briefings. In cases where highly specialized information or techniques require additional explanation or review, schedule a specialized briefing. During the briefing, indicate what preparation has been accomplished and what is yet to be accomplished. Use the following as a guide in conducting a briefing (see AMCMAN 11-211, (S), *Tactical Employment, C-5, C-17 and C-141,* chapter 7, for detailed guidance):

16.3.1. Security classification and roll call for the briefing and mission.

16.3.2. Purpose of the mission, forces required (to include number of aircraft) and a statement of mission requirements in sufficient detail to ensure all crewmembers understand all the information.

16.3.3. Mission Requirements:

16.3.3.1. Crew composition.

16.3.3.2. Crew alerting and reporting.

16.3.3.3. Minimum ground times.

16.3.3.4. Crew duty times.

16.3.3.5. Command waivers.

16.3.3.6. Rules of engagement.

16.3.3.7. EMCON level directed for each phase of flight.

16.3.4. Intelligence information.

16.3.5. Weather information.

16.3.6. Timing and control times to include:

16.3.6.1. Stations, start times, taxi, and takeoff.

16.3.6.2. Force Rejoin, ARCT, TOT and TOA.

16.3.6.3. Landing time.

16.3.7. Review taxi, takeoff, and departure plans to include communications requirements and frequencies.

16.3.8. Navigation and altitude reservation flight plan.

16.3.9. Air refueling information and procedures.

16.3.10. Threats and special mission tactics.

16.3.11. Cargo load information.

16.3.12. Recall and diversion procedures.

16.3.13. Recovery and alternate base.

16.3.14. Announcements to include technical order status and changes, flying safety, specialized briefing times and locations, debriefing and interrogation location and procedures, messing, transportation, personal equipment, radio, and communications procedures and crew questions.

16.4. Crew Mission Study and Detailed Flight Planning. After mission tasking is analyzed and intelligence, weather, and mission support information is available, detailed mission planning begins. During this phase, the planning staff will study all mission variables to develop a plan which minimizes the threat and optimizes the probability of a successful mission. Route selection should begin at the objective area. Planning should then be done in reverse from the objective to the initial point (IP), then to the low level or combat entry point and then to the departure base. Egress routing is then planned from the objective area to the combat exit point and recovery base. Planning routes with the most detailed scale charts available provide enhanced chart details. JOG (1:250,000) charts, if available, are recommended for planning the route to and from the objective area. Flight planning emphasis should be placed on the topographical features at least 10 NM either side of the intended flight path.

16.4.1. Objective Area Planning. The most important segment of the route is from the IP to the objective. On this segment threat avoidance, navigation, and timing are most critical. The IP should be an easily definable visual point, unique in appearance and not subject to significant alteration.

16.4.1.1. Plot the objective (target) using the most detailed scale chart available. The area should also be examined using any available imagery.

CAUTION: 1:50,000 and smaller scale maps do not depict aeronautical information, may not show man made obstructions, and are rarely updated through the Chart Update Manual (CHUM).

16.4.1.2. Evaluate hostile defenses/OBs within the area of operation. Initially plot maximum effective radar/threat ranges for worst case drop altitudes without regard to terrain masking.

16.4.1.3. Select the IP and pre-initial point (pre-IP) based on the safest approach to the objective area. If the run-in can not be accomplished around maximum radar and threat ranges, evaluate terrain around the objective area and determine a flight path and altitude with the least possibility of detection. AMCP 55-25 provides formulas and charts for determining detection ranges.

16.4.2. Assault Zone Selection. Assault zone selection and criteria are the joint responsibility of the DIRMOBFOR and the commander of the supported forces; however, planners may be tasked to select usable sites. Detailed assault zone criteria and illustrations can be found in AFI 13-217.

16.4.3. Drop Zone (DZ) Selection. Ground force location, risk to aircraft, and target identification are key factors in DZ selection. Drop zones may or may not be marked, depending on the type of mission, tactical situation, or reception committee capabilities.

16.4.3.1. Ground and air planners will attempt to ensure that the DZ is long enough to avoid multiple passes in a hostile environment. If multiple passes become necessary, they may be accomplished by planning a racetrack/re-attack or an abbreviated route. In any case, multiple passes will not be performed unless they have been coordinated with the user, they have been planned and briefed, and they have been annotated on navigational charts (including the racetrack/re-attack flight path).

NOTE:

Units should develop and publish multiple pass procedures for established drop zones used during routine joint and unilateral training. Choice of abbreviated route or racetrack procedures is at the unit's discretion.

16.4.3.2. Heavy equipment Multiple Points-of-Impact (MPI) provide an aerial delivery employment procedure to disperse heavy equipment to predetermined locations. Locate MPI a minimum of 500 yards from the first heavy equipment PI along the DZ axis with subsequent MPI no closer than 500 yards to the previous MPI on the same DZ axis. Ensure heavy equipment PI distance from leading edge complies with AFI-13-217. Compute minimum size DZ required for the most restrictive aircraft in each element relative to their PI to ensure it fits within the surveyed DZ boundaries. Limit the number of heavy equipment points of impact to three total without MAJCOM approval. All aircraft within an element must drop on the same PI. The coordinates for each PI must be provided to the aircrews. Use the most accurate PI altitude available. For SKE airdrops, ensure aircrews are briefed on zone marker location relative to each PI. Ensure zone marker placement is within 1,500 yards of all points of impact. Thoroughly de-conflict and brief all salvo and escape procedures as well as DZ markings prior to mission execution. Each PI must be marked with a different block letter (shape designators are not authorized). The user accepts responsibility when employing MPI for all injury/damage to personnel/equipment.

16.4.3.3 The following types of drop zones are authorized for airlift employment missions:

16.4.3.3.1. Marked DZ. Authenticated drop zone which has the point-of-impact or release point

marked with a pre-coordinated signal. Markings may be overt (e.g., block letter, flares, smoke, mirror, raised angle marker, etc.) or covert (e.g. IR strobe, radar beacon, zone marker, etc.). No other markings are required (e.g., timing lights or flanking lights). Unless radio communications are specifically required, any pre-coordinated marking displayed on the DZ indicates clearance to drop.

16.4.3.3.2. Unmarked DZ (requires MAJCOM/DO approval). Drop zone not authenticated with any type of marking. This includes both visual and electronic signals. DZ authentication, if required, is possible via radio communications. The DZ may not be supported by a reception team.

16.4.3.3.3. Area DZ. Consists of a start point, end point, and a prearranged flight path over a series of acceptable drop sites between these points. The distance between these points should not exceed 15 nautical miles; changes in ground elevation along the flight path should not exceed 300-feet; and drop sites along the flight path should not exceed 1/2 nautical mile on either side.

16.4.3.3.4. Circular/Random Approach DZ. A circular DZ with multiple run-in headings. Size of the DZ will be governed by mission requirements and usable terrain. Normally, the point of impact will be at the DZ center. The size of a circular/random approach DZ must be large enough for the prescribed minimum size rectangular DZ to fit inside.

16.4.3.3.5. Water DZ. Normally a circular/random approach drop zone which may be marked or unmarked. Computed air release point (CARP), ground marked release system (GMRS), verbal initiated release system (VIRS), or jumpmaster-directed airdrop procedures may be used. For GMRS, the position of the recovery/safety boat usually marks the intended release point. Other options include three or more boats in formation to form an inverted "L" or a floating smoke pot to indicated the point of impact.

NOTE:

Certain tactical situations may prevent marking the DZ. Aircrews may be required to airdrop on unmarked DZs; however, supported units must be made aware that drop accuracy may be reduced. Planners and aircrews must thoroughly develop run-ins with good visual points for timing. Specific airdrop procedures and reception committee capabilities are in **Chapter 19** and AFI 13-217.

16.4.4. Landing Zones (LZ). Landing zone operations are conducted to introduce or evacuate personnel and/or equipment to or from hostile, denied, or unsecured territory. As a general rule, DZ selection considerations also apply to LZ selection. Aircraft performance limitations must be taken into account when selecting a LZ location. LZ size and composition criteria is contained in AFI 13-217.

16.4.4.1. Plan approaches to the LZ IAW airfield identification procedures published in the OPORD or SPINS. Where multiple options are available, select the approach which best minimizes exposure to the threat while still allowing a high probability of landing on the first approach. Remain unpredictable. If no published approach exists, training approaches may be developed, but VFR weather is required.

16.4.4.1.1. Planning a Straight-in Approach.

16.4.4.1.1.1. Ensure the runway is properly defined in either the permanent or custom airfield database.

16.4.4.1.1.2. Determine the final approach course (note any difference from runway azimuth).

16.4.4.1.1.3. Draw a 3 NM corridor along both sides of the final approach course.

16.4.4.1.1.4. Plot an initial approach fix (IAF), 15 NM from the touchdown zone, along the final approach course.

16.4.4.1.1.5. Plot a final approach fix (FAF), 5 NM from the touchdown zone, along the final approach course.

16.4.4.1.1.6. Plot the missed approach point (MAP).

16.4.4.1.1.7. Use minimum IFR altitude criteria from this chapter to determine the ingress altitude from the IAF to FAF. Use this, or the highest traffic pattern altitude the weather or threat allows as the glideslope intercept altitude.

16.4.4.1.1.8. Determine the controlling obstacle from the FAF to the MAP.

16.4.4.1.1.9. Determine the preliminary minimum descent altitude (MDA). Straight-in MDA will be 500-feet above the highest man-made obstacle or terrain feature/spot elevation, or 400-feet plus one contour interval above the highest depicted terrain contour whichever is highest, within three nautical miles from the FAF to the MAP.

16.4.4.1.1.10. Ensure that the FAF distance is 5 NM or less from the touchdown zone.

16.4.4.1.1.11. Plan the missed approach.

NOTE:

Use the predicted times and slowdown points for time control. For slowdowns using thrust reversers, plan to begin slowdown 1NM from the FAF for every 10 knots above approach airspeed.

16.4.4.1.2. Planning a Circling Approach.

16.4.4.1.2.1. Determine the final approach course (note any difference from runway azimuth).

16.4.4.1.2.2. Draw a 5 NM (radius) circle around the geographic center of the airport.

16.4.4.1.2.3. Plot an IAF, 15 NM from the airport, along the final approach course.

16.4.4.1.2.4. Plot a FAF, 5 NM from the airport, along the final approach course.

16.4.4.1.2.5. The airport is the MAP.

16.4.4.1.2.6. Determine the controlling obstacle within the 5NM circle.

16.4.4.1.2.7. Determine the MDA.

16.4.4.1.2.8. Using criteria in this chapter, determine the ingress altitude from the IAF to FAF. Use this, or the highest traffic pattern altitude the weather or threat will allow as the glideslope intercept altitude.

16.4.4.1.2.9. Plot a level off point 2.5 NM from the airport, along the final approach course. Using 500-feet/NM (no wind) from the level off point to the glideslope intercept altitude, confirm the FAF distance is 5 NM or less from the touchdown zone. If not, compute a new FAF distance (new radius) and determine if a new MDA is required.

16.4.4.1.2.10. Plan the circling maneuver.

16.4.4.1.2.11. Use the same slowdown factors as before and plan the missed approach.

16.4.4.1.3. Planning the Missed Approach Segment.

16.4.4.1.3.1. Determine the missed approach point.

16.4.4.1.3.2. Determine the missed approach course, and develop a waypoint to fly to 5 NM from the geographic center of the airport.

16.4.4.1.3.3. Determine the altitude required at this first waypoint using minimum safe altitude (MSA), minimum en route altitude (MEA) or minimum obstacle clearance altitude (MOCA) if applicable, or an ATC required altitude, whichever is higher.

16.4.4.1.3.4. Using 250-feet/NM, ensure this altitude can be obtained with one engine inoperative.

16.4.4.1.3.5. At the aircraft, crosscheck coordinates, courses and distances to ensure accuracy.

16.4.4.1.3.6. Circling missed approaches.

16.4.4.1.3.6.1. Determine the geographic center of the airport. Plan the circling maneuver based on airfield restrictions, threats, etc. Determine a level off point no earlier than 2.5 NM from the center of the airport, along the final course inbound. Plan to be at circling minimums at this point. Use the airport coordinates as the MAP.

16.4.4.1.3.6.2. Circling minimums (MDA) will be 600-feet above the highest obstacle within 5 NM of the geographic center of the airport, or 1,000-feet above the airport elevation, whichever is higher.

16.4.5. Airdrop Altitudes and Airspeeds. Minimum airdrop altitudes and airspeeds for specific loads and parachutes are defined in AFI 11-231. If minimum terrain clearance cannot be satisfied during descent to drop altitude, change the run-in course, delay descent, step down to drop altitude, or airdrop at a higher altitude. Airdrops will not be conducted below the following altitudes:

NOTE:

The aircraft must be level at drop altitude and on drop airspeed by GREEN LIGHT time. Slowdown during personnel drops should be planned to allow jumpmaster access to paratroop doors NLT 1 minute prior to the TOT.

16.4.5.1. Day VMC Drop Altitude. Plan minimum day VMC air drop altitudes as specified in AFI 11-231, visually avoiding high terrain and obstacles in the vicinity of the drop zone.

16.4.5.2. Night VMC Drop Altitude. Plan minimum night VMC airdrop altitudes, from slowdown through escape, at an indicated altitude of 500-feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), or 400-feet plus one contour interval above the highest depicted terrain contour, whichever is higher, within three nautical miles of run-in centerline.

16.4.5.3. IMC Drop Altitude. Plan minimum IFR drop altitudes at 500-feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), or 400-feet plus one contour interval above the highest depicted terrain contour, whichever is highest, within three nautical miles either side of the run-in centerline from DZ entry point to DZ exit point.

WARNING:

Drop zone surveys do not assure terrain and obstruction clearance. That

responsibility is incumbent upon planners and aircrew through thorough mission planning and chart updating.

NOTE:

Altitudes on DZ run-in may be segmented to allow for lowest possible run-in/drop altitude. Once the limiting obstruction (man-made obstacle or terrain feature) is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segment altitude, if lower.

16.4.6 Route Planning. Route selection is dictated by threats, terrain, and aircraft limitations. Evaluate all possible ingress and egress routes for features such as terrain composition and cover, relief features, contour lines, population centers, lines of communication, and other hazardous or compromising areas. Low- altitude masking tactics are essential for penetration operations in a threat environment. The following factors significantly influence route development:

16.4.6.1. In selecting navigation routing, the planner must consider safe passage corridors/procedures and the location of friendly defenses. In this regard, the aircraft must be constantly aware of the status of friendly C3 and procedures for degraded operation. When the friendly C3 structure degrades, the common denominator of friendly defenses will be their own self-preservation. When planning the route, do not assume your aircraft is safe from friendly lines of defense. Plan accordingly and use IFF, communication discipline, and approved safe passage procedures.

16.4.6.2. Threat avoidance is the best line of defense. Select high, ruggedly vegetated terrain where possible. Rough terrain decreases threat mobility, heavy vegetation restricts the field of fire, and low altitudes enhance terrain masking. Evaluate and avoid passive/acoustical detection devices; border guards, observation posts, and fire towers; road/river traffic; railroads; military maneuvers and exercises; military aircraft training; airways and airports; surveillance and patrol boats; fishing vessels; shipping lines of communication (LOC); festival, holiday and vacation gathering places; satellite schedules; and radar. Plan routes to avoid SAMs and AAA concentrations, both of which are usually along lines of communication, intersections, populated areas, and industrial centers. Canals, roads, railroads, and rivers should be crossed at right angles to minimize detection by hostile forces.

16.4.6.3. The most critical detection factor for airlift is radar. Three vulnerabilities can be exploited: maximum theoretical detection range, degraded low-level detection (anti-clutter) capabilities, and the masking properties of obstructions between the antenna and the aircraft. Plan the route using maximum radar/threat detection ranges and worst case route/leg MSA without regard to terrain masking. If routing cannot be planned around maximum radar/threat ranges, evaluate significant terrain between the aircraft and the threat, and evaluate maximum detection free altitudes to determine a flight path and altitude with the least possibility of detection. AMCP 55-25 provides formulas, charts, and graphs to determine target detection ranges.

16.4.6.4. Flights should be planned at the highest altitude that precludes detection. If detection is probable, select flight altitudes which degrade threat engagement effectiveness.

16.4.6.5. Dead Reckoning (DR) navigation is enhanced by prominent landmarks with good vertical development. Natural terrain features are preferable to man-made features which may no longer exist, may be indistinct, or may be newly erected and not portrayed. Use of features that could be masked by intervening terrain should not be used.

16.4.6.6. Do not plan direct flight over built up areas.

16.4.6.7. When unable to avoid hostile areas, select specific tactics, such as terrain masking, night operations, random approaches, or use of support aircraft, which can best counter anticipated threats.

16.4.6.8. Avoid large bodies of water and dry lake beds except in known friendly areas. Camouflage is less effective, sound travels farther and radar detection is more likely.

16.4.6.9. Coastal Penetration. The tactics used to penetrate a coastline depend on the locations and elevations of coastal radar sites. Passive detection is usually enhanced over water. Minimize use of aircraft radar and other emitters.

16.4.6.10. Remain unpredictable. The route of flight will consist of relatively short legs between waypoints which are easily identifiable, either visually or by airborne radar. Select waypoints which minimize detection and maximize threat avoidance and terrain masking. Numerous course changes protect the aircraft and also the objective area by delaying enemy attempts to predict the flight path. The time and distance of each leg should vary and not exceed 10 minutes in the threat environment.

16.4.6.11. Avoid being skylighted. Go around hills rather than over them. If a ridge must be crossed, do so at a low point and, ideally, at a 45-degree angle.

16.4.6.12. Use the sun to your advantage. Plan to fly in shadows whenever possible and place the aircraft's shadow in terrain shadows. Missions operating in or near a threat environment should be planned to transit that environment during early morning or late afternoon. The low sun angles will separate your shadow from the aircraft, improving your masking. Hide your shadow in a ridge line, ridge shadow, cloud shadows or dark vegetation if possible. Missions flown at night or in the clouds can significantly degrade certain threat systems. (Knowledge of enemy threat system shift changes and scheduled preventive maintenance times may prove invaluable when considering these options.)

16.4.6.13. Turns should not be made into significantly higher terrain or other hazards without thorough analysis of aircraft engine-out climb performance .

16.4.6.14. Transit areas defended by small arms at their narrowest or least defended point.

16.4.6.15. If detection is unavoidable, compute the first possible point at which fighters could attack the aircraft. Intelligence personnel should have information on command and control time (from acquisition to launch), aircraft speed and capabilities, and GCI limitations.

16.4.6.16. If flight over or near threat sites is unavoidable, attack aircraft should be part of the employment support package.

16.4.6.17. Vertical and horizontal depiction inaccuracies will exist in virtually all chart products. Many charts list the probable errors in their legend.

16.4.6.18. Define abort corridors for the ingress route. Depending on threats and other aircraft following the same ingress route, the planned route over the objective and egress may be the safest abort route.

16.4.7. Low Level Altitude Restrictions. Low level altitudes will depend upon conditions such as terrain, threat, the necessity to avoid detection, and equipment limitations. The following minimum altitudes are established for AMC airlift operations. Higher altitudes may be dictated by FLIP/ICAO procedures, training considerations, terrain, or operational directives.

16.4.7.1. Minimum Safe Altitude (MSA). MSA is an altitude which provides terrain clearance if the crew must interrupt low level operations to regain situational awareness, regain route orientation, or

handle aircraft malfunctions. While MSA provides obstruction clearance, it does not necessarily provide signal coverage from ground-based navigational aids, air traffic control radar, or communications coverage. An MSA may be computed for each leg, route segment, or entire low level route. Compute MSA by adding 1,000-feet (2,000-feet in mountainous terrain) above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation) within five nautical miles of route centerline. Outside the United States, the distance from centerline should be increased to 10 nautical miles in controlled airspace. The MSA should be rounded off to the next higher 100-foot increment**.**

NOTE*:*

When climbing in VFR to the MSA, or higher, the aircraft may enter a controlled (i.e., IFR) altitude structure requiring coordination with air traffic control agencies. Route study is needed to identify not only obstruction hazards, but also airspace and potential air traffic above or near the route. Consider climbing to the next higher VFR hemispherically correct altitude above the MSA.

16.4.7.2. Minimum IFR En Route Altitude. Compute minimum IFR en route altitude by adding 1,000-feet (2,000-feet in mountainous terrain) above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation) within five nautical miles of route centerline. Outside the United States, the distance from centerline should be increased to 10 nautical miles in controlled airspace. The minimum IFR en route altitude should be rounded off to the next higher 100-foot increment.

16.4.7.3. Day VMC. Plan a minimum of 300-feet AGL modified contour altitude above the terrain using visual references and radar altimeter.

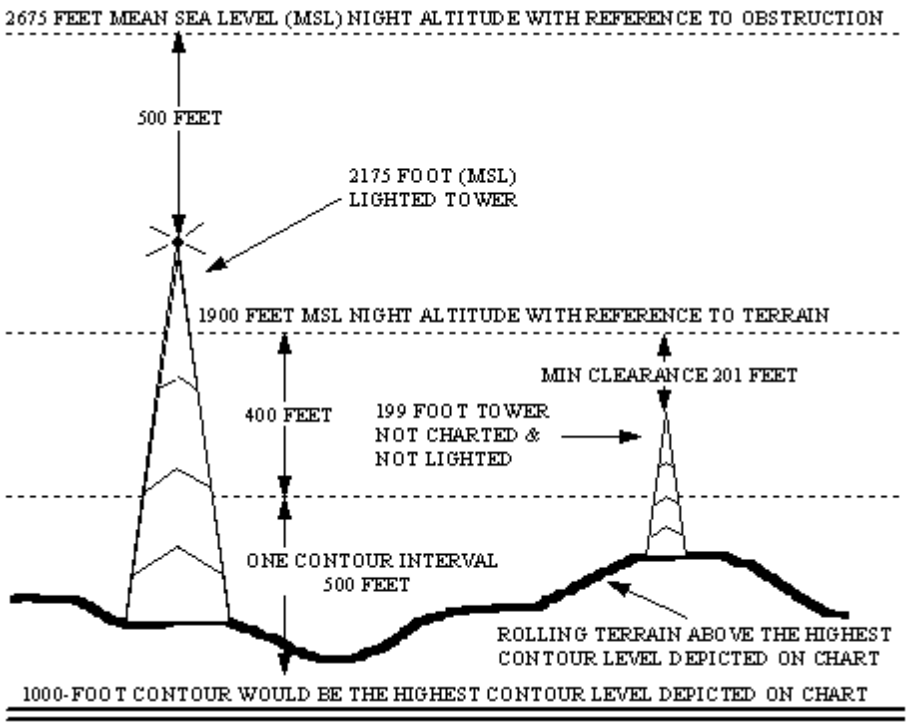
NOTE*:*

Airland-only qualified crews are restricted to no lower than the MSA for the route (night or day VMC).

16.4.7.4. Night VMC. Plan en route legs at an indicated altitude of 500-feet above the highest obstruction to flight (man-made obstruction, terrain feature, or spot elevation), or 400-feet plus one chart contour interval above the highest depicted terrain contour, whichever is highest, within five nautical miles of route centerline. Once the obstruction or terrain feature is visually identified and the aircraft is confirmed well clear, the crew may descend to the next segmented altitude, if lower. **Figure 16.1** illustrates an example of night VMC en route altitude calculations.

NOTE: Airland-only qualified crews are restricted to no lower than the MSA for the route (night or day VMC).

Figure 16.1. Minimum En Route Altitude.



16.4.7.5. Minimum altitudes for IFR operations within published Military Training Routes (MTR) in US sovereign airspace will be computed leg minimum IFR en route altitude unless a higher altitude is required by FLIP AP/1B. In the absence of a computed leg minimum IFR en route altitude, fly at the top of the published MTR block altitude.

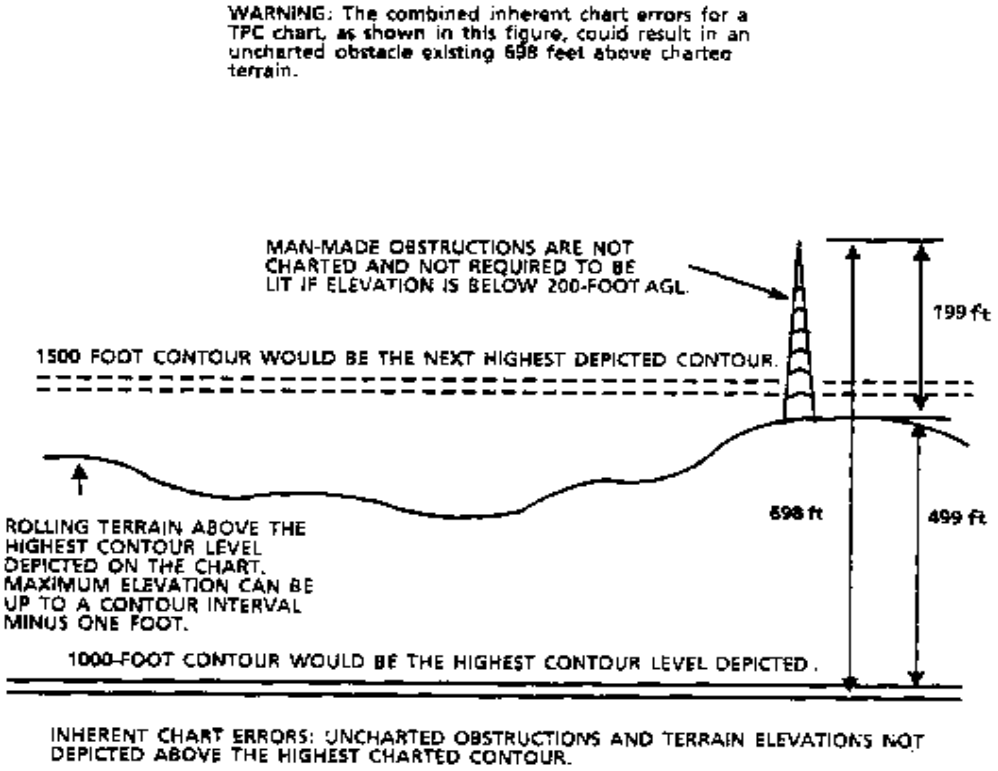
16.4.7.6. Detection Free Altitude (DFA). DFA is the highest altitude an aircraft can transit a point and remain below the radar's coverage. AMCP 55-25 provides instructions to determine DFA.

16.4.7.7. Emergency Safe Altitude (ESA). ESA is designed to provide positive IMC terrain clearance during emergency situations that require leaving the low level structure. Several ESAs may be computed for route segments transiting significant terrain differentials or a single ESA may be computed for the entire low level route. To compute ESA, add 1,000-feet (2,000-feet in mountainous terrain as defined in FLIP) to the elevation of the highest obstacle within 22 nautical miles of planned route centerline. The ESA should be rounded off to the next higher 100-foot increment.

WARNING: Aeronautical charts do not depict a change in terrain until it exceeds the chart contour interval or man-made obstacles less than 200-feet AGL may not be depicted. The worst situation would occur if a 199-foot tower sat on terrain with an elevation just below the next higher contour. For a TPC (1:500,000) with a contour interval of 500-feet, this results in an uncharted obstacle existing 698-feet above charted terrain. Additionally, the highest spot elevation on any given leg may not be the highest terrain as in the case of gradually rising elevations. Planners must ensure accurate terrain analysis by evaluating both spot elevations and the highest contour level. **Figure 16.2** illustrates uncharted obstacles and terrain elevations not depicted above the highest charted contour.

CAUTION: Some charts may depict terrain and obstacle altitudes in meters versus feet (e.g., JOG and TLM charts in some areas of the world).

Figure 16.2. Inherent Chart Errors.



16.4.8. Peacetime Route Restrictions. Routes should not be planned or flown over the following:

16.4.8.1. Below 2,000-feet AGL with less than one nautical mile (three nautical miles when below 2,000-feet AGL in excess of 250 KCAS) separation from known sensitive environmental areas such as hospitals, fish hatcheries, large poultry complexes, recreation areas, institutions, and similar locations.

16.4.8.2. With less than three nautical miles separation from prohibited airspace.

16.4.8.3. With less than three nautical miles separation from nuclear power plants as listed in FLIP AP/1B, Chapter 5.

16.4.8.4. Through restricted airspace, except transition or termination in such areas where the planning unit is a primary using agency or has approval of the controlling agency.

16.4.8.5. In weather conditions less than those specified in this AFI, AFI 11-202V3, or FLIP.

16.4.8.6. Below 1,000-feet AGL within a 2,000-feet radius over cities or towns shown as magenta shaded areas on 1:500,000 scale charts.

16.4.8.7. Over or through active live fire or impact areas that may not be specifically designated as prohibited or restricted areas.

16.4.8.8. Below 500-feet AGL unless:

16.4.8.8.1. Host nation rules specifically allow such VFR operations.

16.4.8.8.2. Routes or training areas have been environmentally assessed and surveyed for 300 foot AGL operations. (This restriction does not apply to one-time use routes. Consult FLIP AP/1B for published MTR restrictions.)

16.4.9. For IFR airdrop operations using the SKE system in uncontrolled airspace, the mission command unit must comply with Federal Aviation Administration (FAA) Exemptions 4371C (contact HQ AMC/DOV). For operations into areas were no letter of agreements between local ATC and the military for this operation exists, you must establish a letter of agreement, and provide a Notice to Airmen (NOTAM) to the FAA Flight Service Station nearest the objective area at least 48 hours in advance of the intended activity, regardless of actual or forecast weather. NOTAM information will include:

16.4.9.1. Name of the nearest city or town and state.

16.4.9.2. Date and time period of intended activity.

16.4.9.3. Number and type of aircraft.

16.4.9.4. Altitudes.

16.4.9.5. En route and egress points of the route segment (normally DZ entry and exit points) expressed in radial/DME from a VORTAC. The distance between the DZ entry point and exit points must not exceed 40 NM.

NOTE:

Additional low level route criteria are contained in AFI 11-202V3 and FLIP Area Planning.

16.4.10. Navigation Chart Preparation. Mission planners should construct a master chart for mission briefings and aircrew reference. Navigators and pilots not flying the aircraft will use low level navigation route charts for each mission. Low level navigation charts will be prepared from the most current editions available and will be annotated with any added, deleted, or changed information as contained in the most recent CHUM or supplement. Charts will display CHUM data within 22 NM of intended route centerline in order to determine an ESA). In addition, if using a published MTR, display CHUM data for the route corridor. CHUM data will be referenced when determining the ESA and MSA, and the date of the last CHUM update will be annotated on the back of the chart.

16.4.10.1. Chart Annotation (**Figure 16.3**). The following chart annotations and symbols are recommended for the master planning chart; however, individual chart annotations are at the discretion of the aircrew member:

Figure 16.3. Chart Annotations.

TURNPOINT/WAYPOINT **INITIAL POINT** **OBJECTIVE** **EMERGENCY AIRFIELD** **ALT. RECOVERY BASE**

16.4.10.1.1. Turnpoint/Waypoint. A circle will depict both en route turnpoints and key en route navigation waypoints. Points may be lettered, numbered, or code-named to facilitate identification.

16.4.10.1.2. Initial Point. Annotated as a square, this is normally a visually significant geographic point that marks the beginning of the course to the objective.

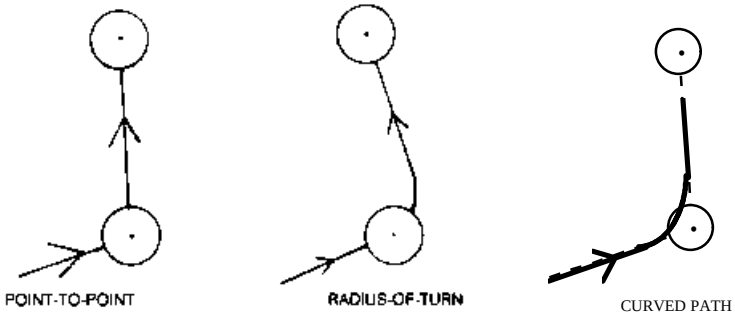
16.4.10.1.3. Objective. Annotated as a triangle, this point is significant as the target of the airlift mission (normally a DZ or LZ).

16.4.10.1.4. Emergency Airfield. An airfield which is not planned as the primary or alternate recovery base but may be used for landing. A circle with a diagonal line placed along axis of the primary landing runway identifies emergency airfields suitable to mission aircraft. Optimum emergency airfields are located within 50 NMs of intended route approximately every 100 NMs.

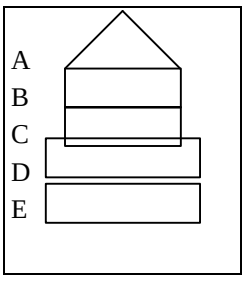
16.4.10.1.5. Alternate Recovery Base. Two concentric circles identify an airfield suitable for unit aircraft recovery should the primary recovery base be unusable due to weather, damage, or other reason. Plot a course from either a planned divert point or from the primary recovery base to the alternate.

16.4.10.1.6. Course Line (**Figure 16.4**). The route of flight may be plotted point-to-point, radius-of-turn, or curved path (serpentine). Point-to-point is usually assumes turning short of the waypoint, however it may be modified to overfly the waypoint and intercept the next point-to-point course. Radius-of-turn results in waypoint overflight, followed by a direct course to the next waypoint. Serpentine routes reflect the aircrew's pre-planned terrain masking/threat avoidance flight path. Course data is normally segmented along the route.

Figure 16.4. Turn Reference.



16.4.10.1.7. Navigation Information Block (NIB). Provides navigation information to the next waypoint, and/or objective. It is normally placed to the right of each point, or at the beginning of each strip chart leaf if the route leg extends beyond one leaf. NIBs may be modified for mission requirements; however, as a minimum, the course arrow block (items A, B, and C, below) for each leg will be annotated. The standard NIB contains items A through E.



16.4.10.1.7.1. A - Magnetic or true course (after rollout) to the next waypoint/objective.

16.4.10.1.7.2. B - Distance (in NM or TTG) after rollout to the next waypoint or objective (or elapsed time at the next point, as desired).

16.4.10.1.7.3. C - Altitude (day/night altitude or MSA for the leg).

16.4.10.1.7.4. D - Latitude Coordinates for the next point.

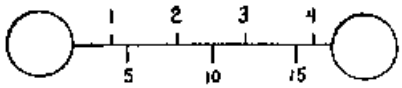
16.4.10.1.7.5. E - Longitude Coordinates for the next point.

16.4.10.1.8. Minimum Safe Altitude (MSA). MSA will be conspicuously annotated.

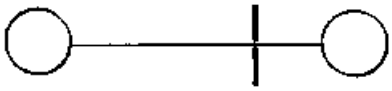
16.4.10.1.9. Multiple Passes. Depict racetracks/re-attacks or abbreviated routes associated with multiple passes over the drop zone.

16.4.10.1.10. Recovery Arrow Box. A horizontally divided arrow box pointing in the general direction of the alternate recovery base, providing base name, true/magnetic course and distance to the alternate.

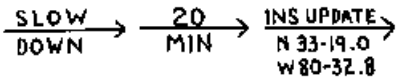
16.4.10.1.11. Time and Distance Marks. Small tick marks along each leg to show time or distance to go to the next turnpoint/waypoint.



16.4.10.1.12. Combat Entry Point (CEP). A heavy line crossing perpendicular to the course, locating the point at which the low level portion of the mission begins.



16.4.10.1.13. Operational Advisory Arrows. Annotations concerning operational aspects of the mission, located where the en route maneuver should be performed. Examples of these maneuvers are slowdown, start climb, begin descent, IAF and FAF. Advisory arrows may also be used to denote locations of airdrop checklist execution.



16.4.10.1.14. Order of Battle (OB). Denote location, type, and effective radii of enemy systems. Mark charts with appropriate classification if required and handle accordingly.

16.4.10.1.15. The location of the DZ entry point, stabilization point, and DZ exit point on IFR route charts.

16.4.10.1.16. Strip Chart Booklets. These booklets of navigational charts provide a continuos depiction of a route and are normally prepared in one of two formats. The exact format and information required may be standardized within wings.

16.4.11. Mission Forms and Logs. Local overprint of the following forms is authorized.

16.4.11.1. Pilots Information. The planning staff will complete a pilot information sheet.

16.4.11.2. Low Level Flight Plan and Log. An AF Form 4051, **Low Level Flight Plan and Log**, should be used when planning low level missions. A MAJCOM-approved computer-generated flight

plan (such as an AFMSS-generated plan) may be used in lieu of the AF Form 4051.

16.4.12. Aircrew Flimsy. Aircrew flimsies are a standardized collection of essential operational information required by aircrews to complete mission planning, conduct route study, fly the mission, and comply with post-mission ground procedures and debriefing requirements. AMCP 55-25 provides a suggested format, and describes the AMC electronic flimsy system.

16.4.13. Route Study. Crew route study is mandatory before accomplishing flight in the low level environment. An intensive review of the ingress, objective area, and egress routing by the entire crew leads to superior crew coordination and safe mission execution. Aircraft turns planned into higher terrain, critical obstacles which do not meet three engine climb performance, terrain analysis, threat locations, terrain masking and tactics must be discussed. Special emphasis should be placed on the run-in and objective area for the locations of visual and radar features which will assist in proper identification. The importance of route study cannot be over-emphasized.

16.4.14. Tactical Aircrew Coordination. Effective crew coordination is crucial to the success of any flight, especially during combat aerial delivery operations, and will be discussed prior to executing the mission. A convenient time for the entire aircrew to discuss who is going to do or say what during each phase of the mission is during route study and/or the mission briefing. Assigning specific in-flight duties, such as who is going to fly the drop and what threat lookout calls are expected, will reduce confusion at the wrong time. While there is no clear cut definition of crew coordination, the concept deals with the ability of the aircrew to handle a rapidly changing environment and successfully perform the task at hand. This requires maintaining a high level of situational awareness through the crossflow of information between various crew positions. Information should be relevant, accurate, complete, timely, and concise, particularly for the objective area and threat reaction maneuvers. Crew coordination discussions should also encompass individual technique, limitations, emergency procedures, and previous lessons learned.

16.4.15. Final Review. As both a final and on-going step, planners and aircrews should conduct "what if" sessions to detect and solve potential problem areas (e.g. aircraft aborts, recall procedures, weather deterioration, breakdown in various parts of the plan, unscheduled resistance, secondary mission objectives, etc.). "What ifs" must be planned and briefed as thoroughly as the primary scenario. Additionally, limiting factors which impact mission accomplishment and aircrew survivability should be addressed and briefed to the appropriate chain of command. Document "what ifs," limiting factors, planning and aircrew concerns in Section J (Miscellaneous) of the mission planning folder.

16.5. Joint Mission Briefing or Mission Briefing. Joint representation is desirable when more than one service is participating. Briefings should be clear, concise and provide only mission essential information. Requirements of particular missions will determine sequence and content of individual briefings. AMCP 55-25 provides a recommended outline. Planners should adjust the format and extract (or add) items to conform to specific mission profiles. Conduct after each individual crewmember has completed their mission preparation. All crewmembers will be present unless excused by the mission commander. Crewmembers not present must be briefed by the aircraft commander prior to takeoff. The mission commander, or mission planning staff, must re-brief the mission when the time interval from initial aircrew briefing to mission takeoff exceeds 72 hours.

16.6. Specialized Briefing. (See **Chapter 6)**

16.6.1. Pre-Deployment Briefing. Prior to deployments, the operations officer, mission commander, or designated representative should assemble the crew and brief description and purpose of the mission,

tentative itinerary, aircraft configuration, special equipment, fuel load, clothing required, anticipated housing and messing facilities, sufficient money to defray individual's anticipated expenses, personal equipment/field equipment requirements, special clearance requirements, and flying safety.

16.6.2. Specialist Briefing. Conduct specialist briefings to detail operating procedures or special interest items. The mission commander determines the requirement for this briefing. When appropriate, hold specialist briefings at the completion of the formal mission briefing for aircraft commanders, navigators, loadmasters, aeromedical personnel, jumpmasters, assault zone control officers, combat control team (CCT) and drop zone support team (DZST) personnel.

16.6.3. Serial Lead Briefing. The serial leader will assemble all pilots and navigators participating in his/her serial to cover any changes or additions arising after the formal mission briefing. Only applicable items need be briefed. Conduct this briefing as appropriate, to allow sufficient time to complete necessary aircraft inspections and jumpmaster, loadmaster, or parachutist briefings before station time.

16.7. Weather Briefing. (See **Chapter 6**)

16.8. Post Mission Debriefing:

16.8.1. Hold immediately after the mission if practical. Include the following:

16.8.1.1. Aircrews should attend the operations and maintenance debriefings as directed by unit or mission commander. Maintenance de-brief should be conducted ASAP after flight.

16.8.1.2. A crew critique should be conducted with the entire crew present.

16.8.1.3. Intelligence Debriefing. Intelligence debriefings must be accomplished as soon as practical after mission recovery, normally within 30 minutes.

16.8.2. Aircrew Critique. Mission critiques and debriefings are perhaps the most important learning tool available to aircrews and will be done after each mission. All crewmembers should attend. Use this time to review the entire mission. This is the time to learn. Undue concern about crewmembers feelings may prevent them from learning something that may save future missions. The critique must be done objectively . Bring out the positive as well as the negative. Review techniques, offer suggestions for improvement, and most importantly learn from the mistakes.

Chapter 17

EMPLOYMENT

NOTE: **Certain technical information was intentionally omitted or generalized to keep this chapter unclassified. Users should be aware that written additions to any portion of this document could cause it to become classified.**

Section 17A--General Procedures

17.1. General. Tactical airland operations will play a significant role in moving and resupplying ground forces. Use these procedures and the flight manual when operating into threat airfields. In a threat situation crewmembers must understand their limitations and those of their equipment. These procedures are not all encompassing; therefore, aircrews are expected to use good judgment, innovation, and common sense to successfully accomplish the mission.

17.2. Airfield Requirements. AFI 13-217 depicts the required markings for a landing zone (Airfield Marking Pattern 3). These markings are desirable for tactical airland operations; however, full markings are not mandatory on hard surfaced runways that are permanently marked or lighted to make the touchdown zone and runway distances readily identifiable, or if the tactical situation does not permit. The ground reception party (ALCE, CCT) will provide communications and navigational aids based on requirements, capability, and the threat environment.

17.3. Tactical Airland Checklists. Amplified checklists applicable to airland operations are included in this chapter. Complete these checklists at a convenient time prior to entering and upon departing the threat or low level environment.

17.4. Energy Management. Carefully consider performance data and energy management when planning low-level operations, particularly in mountainous terrain at heavy gross weights. Failure to manage energy levels may cause a stall or require a go-around. Slips and skids can help dissipate energy quickly or tighten a turn; however, uncoordinated flight increases airframe structural loading and shall be avoided unless an actual threat exists. In addition, uncoordinated flight reduces stall margins and can cause an abrupt departure from controlled flight.

Section 17B--En Route

17.5. Navigation:

17.5.1. Threats permitting, use all available aids (e.g., map reading, INS/GPS, TACAN) to remain position oriented.

17.5.2. The pilots and other crewmembers as designated by the aircraft commander share responsibility for en route navigation, terrain avoidance, and time control. During low-level operations, a composite crosscheck is paramount for the pilots to ensure threat avoidance and navigation are not done at the expense of basic aircraft control. The attention of the other crewmembers (navigator, observers) should be focused outside the aircraft, emphasizing threat detection and situational awareness. Limit duties which distract attention from outside the aircraft to mission essential items only.

17.5.3. Maintain flight planned altitude using the best available altimeter setting, radar altimeter information, or terrain.

Section 17C--Objective Area

17.6. General. Threat analysis, planning, and flexibility are key factors in planning combat airland operations. See **Chapter 16** for specific mission planning procedures.

17.6.1. Any given approach offers advantages and disadvantages. The approach should avoid all threat envelopes. If this is not possible, reduce aircraft exposure time as much as possible using the proper altitude, airspeed, and flight path. When more than one aircraft is involved, using multiple routes, altitudes, and traffic patterns may hamper targeting efforts by the enemy. The entry, slowdown, and traffic pattern must ensure a successful landing on the first attempt, but leave adequate margins for the unexpected.

17.6.2. Planning cannot be overemphasized. Analyze environmental factors such as altitude winds, visibility, and weather phenomena and take full advantage of terrain. Also consider decision points, emergency escape plans, and alternate approaches. Decision points are times, positions, or events which should commit you to a specific course of action. Having emergency escape plans and alternate courses of action available will enhance survival.

Section 17D--Approaches

17.7. General. Hostile activity, weather, aircraft weight, or terrain may require significant modifications to normal traffic patterns. The following paragraphs provide examples and techniques; however, aircrew ingenuity, proficiency, and judgment are keys in determining the type of approach to fly. Use normal habit patterns as much as possible when flying these approaches. Plan on intercepting glidepath no later than three-quarters of a mile prior to the touchdown zone. Limit bank angles to 30 degrees below 1,000-feet AGL at night and below 400-feet AGL during daytime. See AMCMAN 11-211(S), *Tactical Employment, C-5, C-17 and C-141* for description of these approaches.

17.8. Low Altitude Approaches. Use these approaches primarily when a low altitude ingress is necessary, e.g., radar SAMs en route to the field. All maneuvering is done at low altitudes. Enter these approaches from any direction at en route altitude and airspeed.

17.8.1. Straight - In (**Figure 17.1.**). This approach appears the simplest, but may be the most difficult to execute consistently. The lack of turns means energy dissipation is one dimensional, making the timing of slowdown critical. The key to a successful approach is timing the slowdown to obtain the proper configuration. Approximately 3 NM are required to slow from 230 KCAS to approach speed in level flight. From 250 and 280 KCAS plan on 4.5 to 5 NM and 6 NM, respectively. These are minimums and do not include the effects of tailwinds or heavy gross weights. This approach may be varied by using an angling final, dog leg, or an entry to base using the same basic techniques.

17.8.1.1. Advantages:

17.8.1.1.1. Requires very little low-level maneuvering.

17.8.1.1.2. Minimum exposure to the threat environment.

17.8.1.2. Disadvantages:

17.8.1.2.1. The aircraft is slowed further from the airfield than other types of approaches.

17.8.1.2.2. Precise navigation is critical to finding the runway.

17.8.2. Teardrop (**Figure 17.1.**). This approach allows you to convert from a straight-in landing to a landing in the opposite direction, similar to a circling approach. Enter at en route airspeed and dissipate energy throughout the approach. Start slowing approximately one mile from the approach end and

offset to the side of the runway. Turn base when approximately even with the landing threshold, adjusting for winds.

17.8.2.1. Advantages:

17.8.2.1.1. Flexible enough to allow adjustments to manage your energy.

17.8.2.1.2. Maintains ingress airspeed until near the airfield.

17.8.2.1.3. LZ acquisition nearly the same as a straight-in, but less precision required due to a more flexible pattern.

17.8.2.2. Disadvantage. Maneuvering at low altitude and airspeed.

17.8.3. Abeam (**Figure 17.1.**). This approach offers the flexibility to land in either direction and allows some reconnaissance of the field as you fly over. The keys to a successful approach are slowing from en route airspeed once the aircraft is within the "safe area" and initiating the base turn with 40 percent flaps and gear.

17.8.3.1. Advantages:

17.8.3.1.1. Maintain ingress airspeed until over the airfield.

17.8.3.1.2. Constant turning degrades you as a target.

17.8.3.1.3. Less precise navigation required.

17.8.3.1.4. Easier airfield acquisition.

17.8.3.2. Disadvantages:

17.8.3.2.1. Considerable maneuvering near the ground with decaying airspeed.

17.8.3.2.2. Possible loss of position awareness during turn to downwind.

17.9. High Altitude Approaches. Use these approaches when a high or medium altitude ingress is necessary, e.g., small arms environment, and allow some reconnaissance of the field as you fly over. Base initial altitude, airspeed, and heading on the threat.

17.9.1. VFR Overhead (**Figure 17.2**). Enter initial at 230 KCAS at the overhead pattern altitude. At the approach end, retard the throttles to idle and break as the tactical situation permits with approximately a 45-degree angle of bank. Make a level turn to downwind, configuring with flaps when below 215 KCAS and gear when below 200 KCAS. Maintain V_{APP} + 30 KCAS on downwind. Use no more than 30 degrees of bank from downwind to final with an airspeed of V_{APP} + 20 KCAS minimum until on final.

17.9.1.1. Advantages:

17.9.1.1.1. Expedites arrival.

17.9.1.1.2. Keeps airspeed high until overhead the airfield.

17.9.1.1.3. Disadvantage. Aircraft is easily observed.

17.9.2. Random Steep and Curvilinear approaches (**Figure 17.3** and **Figure 17.4**). Key points are: idle power, gear down, flaps landing, and maximum airspeed 180 KCAS. With a 10 - 12 degree nose low pitch attitude you can expect to lose approximately 1,200-feet per NM flown or 2,000-feet per 90

degrees of turn. These approaches can be started from a variety of directions: abeam, initial, or opposite direction. In all cases, situational awareness is paramount to ensure the aircraft can land safely.

17.9.2.1. Advantages:

17.9.2.1.1. Allows adjustments for energy management.

17.9.2.1.2. Crew can maintain visual contact with the runway.

17.9.2.1.3. Constant turning hampers enemy targeting (random steep).

17.9.2.1.4. No low-level maneuvering required.

17.9.2.1.5. Easier to acquire the airfield.

17.9.2.1.6. Expedites arrival (2 minutes from 5,000-feet AGL) while keeping you close to the airfield.

17.9.2.2. Disadvantages:

17.9.2.2.1. Slow airspeed throughout approach.

17.9.2.2.2. Aircraft is easily observed.

17.9.2.2.3. Possibility of high sink rates close to the ground, with low power settings.

Section 17E--Ground Operations

17.10. General. This section outlines procedures to follow when conducting engines running on/off loads (ERO). Crews should spend minimum time on the ground when accomplishing EROs. Preparation and a thorough briefing enhance your ability to operate quickly and safely. Brief appropriate ground personnel and subsequent aircrews on unexpected hazards encountered during takeoff or landing, e.g., dust, winds, hostile activity. Conduct EROs according to **Chapter 5**. Conduct emergency airlift of personnel according to **Chapter 13**.

Section 17F--Departures

17.11. General. Consider the same factors used for arrival planning. Plan your departure to minimize the time spent within the threat environment, either egressing low level or spiraling up to altitude.

17.12. Low Escape. Use this departure when a low altitude escape is necessary, e.g., radar SAM threat. Remain as low as required while accelerating to en route airspeed. Retract flaps when clear of all obstacles and at or above V_{MFR}, even if below flap retract altitude. Climb to en route altitude on departure heading.

17.13. High Escape. (**Figure 17.5**) Use this departure when a high or medium altitude escape is necessary, e.g., small arms environment. Accelerate to the best climb speed for the conditions and spiral up to altitude remaining within the confines of the airfield boundary.

Figure 17.1. Low Altitude Approaches.

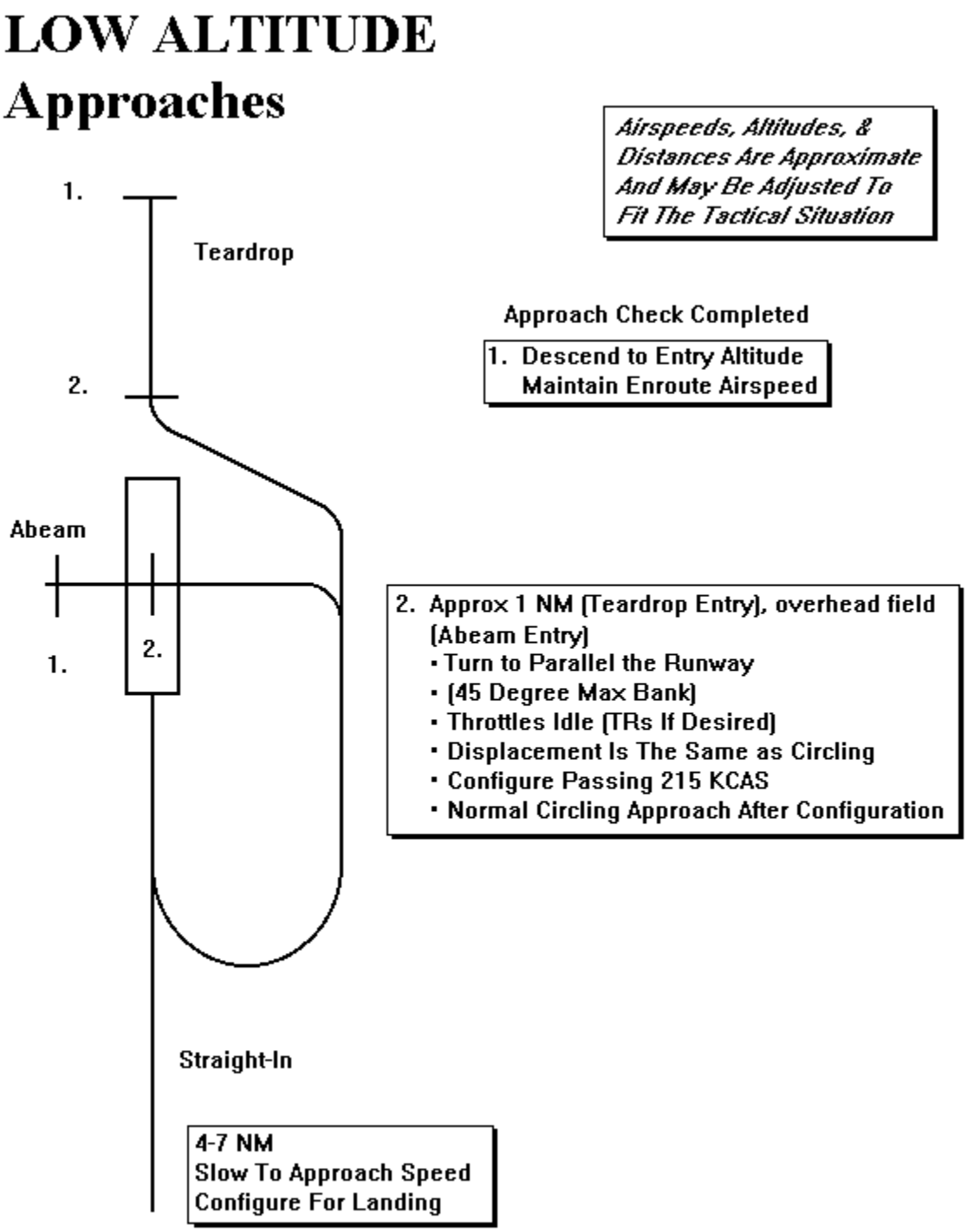


Figure 17.2. VFR Overhead.

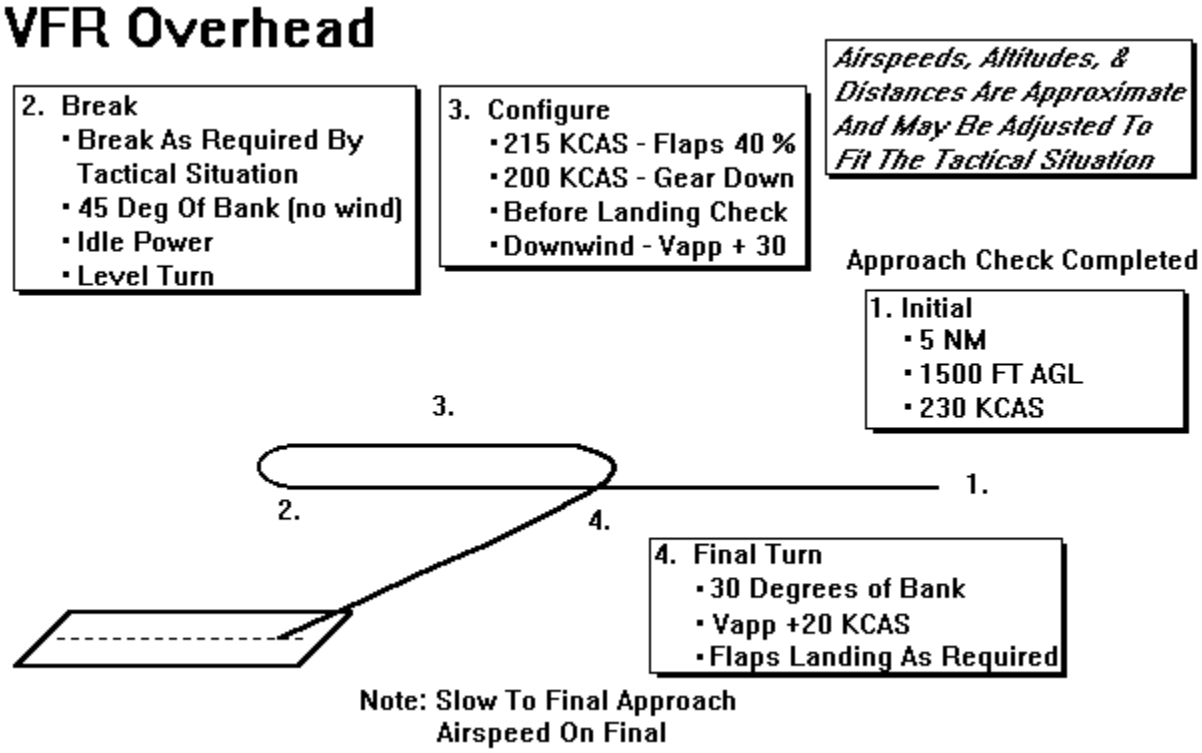


Figure 17.3. Random Steep Approach.

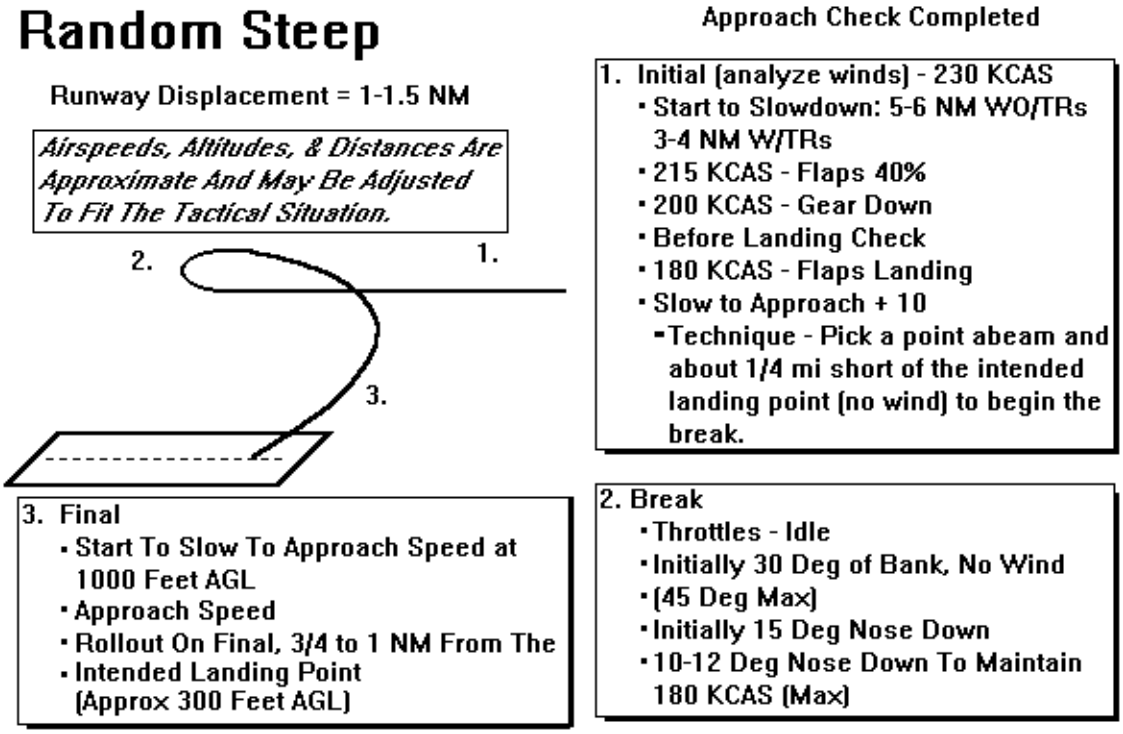


Figure 17.4. Curvilinear Approach.

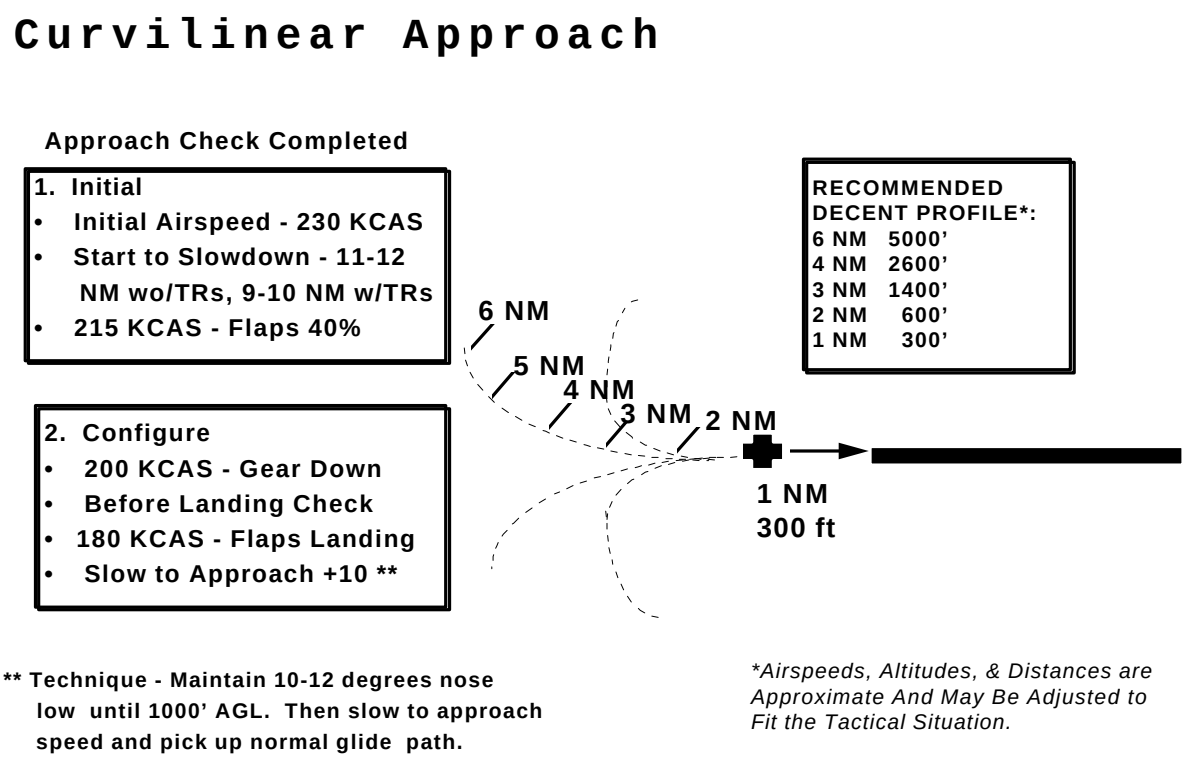
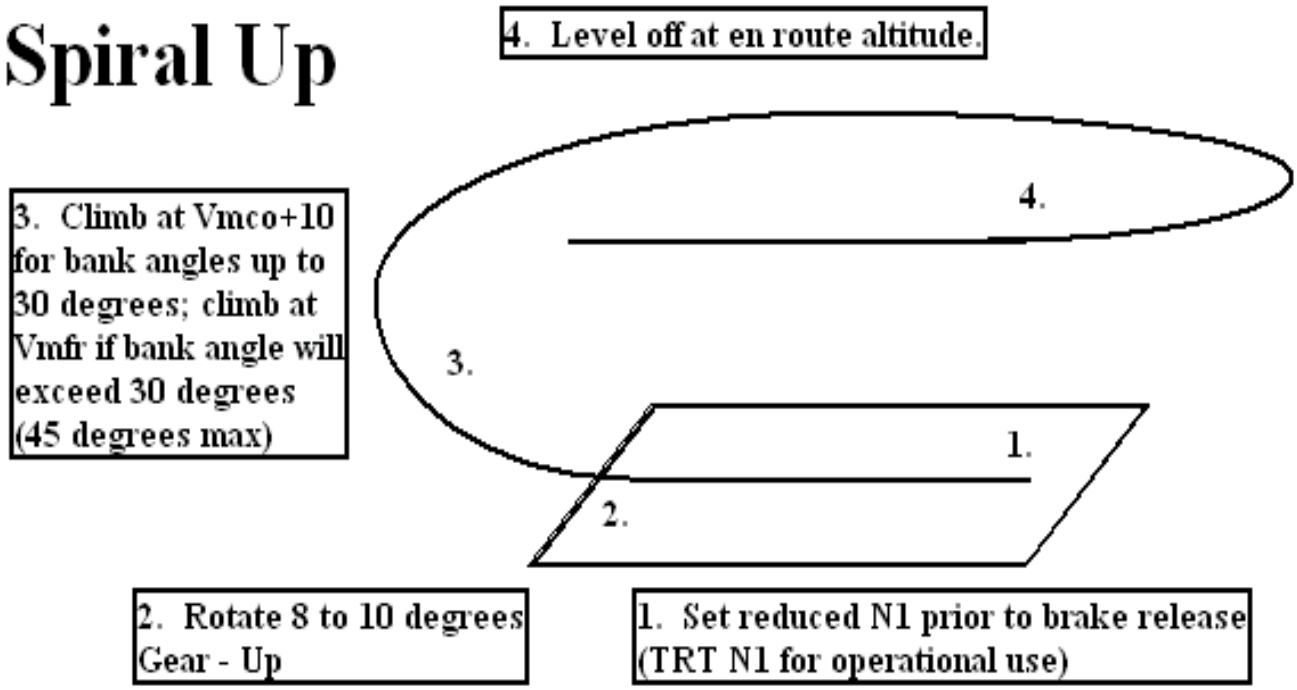


Figure 17.5. High Escape.



17.14. COMBAT ENTRY CHECKLIST. Complete this checklist prior to entering the combat environment. Comply with the following items as necessary to provide maximum survivability based on the mission requirements. Pilot will initiate checklist. Loadmasters acknowledge by occupied compartment.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "CREW, COMBAT ENTRY CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E) 2. Aircrew Briefing - "COMPLETED" (P) Highlight only those items that have changed since the Predeparture Briefing.	1. "CREW, COMBAT ENTRY CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E)	1. "CREW, COMBAT ENTRY CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E) 2. Aircrew Briefing - "COMPLETED" (P)	1. "CREW, COMBAT ENTRY CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E)
3. Altimeters - "STATE SETTING" (CP, P, N) 4. Radar Altimeters - "STATE SETTING" (CP, P)	3. Altimeters - "STATE SETTING" (CP, P, N)	3. Altimeters - "STATE SETTING" (CP, P, N) 4. Radar Altimeters - "STATE SETTING" (CP, P)	
Use radar altimeters for terrain avoidance unless emissions would compromise position. 5. Continuous Ignition - "ON" (P)		5. Continuous Ignition - "ON" (P)	
6. Bleed Air/Pressurization - "AS REQUIRED" (P) Intent is to minimize damage caused by rapid decompression due to enemy fire. Crew must remain cognizant of cabin altitude if lowering pressure differential at high aircraft altitude.		6. EPR/N1 Command Markers - Set MRT 7. Bleed Air/Pressurization - "AS REQUIRED" (P) Intent is to minimize damage caused by rapid decompression due to enemy fire. Crew must remain cognizant of cabin altitude if lowering pressure differential at high aircraft altitude.	

COMBAT ENTRY CHECKLIST (continued)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		8. Air Conditioning Master Switch - AS REQUIRED 9. Fuel Panel - SET a. All Main Tank Boost Pumps - ON b. Crossfeed Valves - CLOSED **NOTE** Burn fuel from the Extended Range then the Aux tanks through the Main Tanks.	
7. IFF - "SET" (CP) Operate IFF/SIF IAW operational plans and briefings. 8. Nav and Comm radios - "AS REQUIRED" (CP, P) Turn unnecessary radios off to reduce emissions. Position TACANs to REC.		10. IFF - "SET" (CP) 11. Nav and Comm radios - "AS REQUIRED" (CP, P)	
9. Radar - "AS REQUIRED" (CP, P, N) If conditions permit, turn radar off.	3. Radar - "AS REQUIRED" (CP, P, N) If conditions permit, turn radar off.	12. Radar - "AS REQUIRED" (CP, P, N)	
10. GPWS - "SET" (CP)	4. GPWS Circuit Breaker - OPEN	13. GPWS - "SET" (CP)	
If GPWS warnings will interfere with cockpit communications [A] inhibit the GPWS, [B] open the 2-amp GPWS circuit breaker, avionics AC bus #1, Phase C on the navigator's overhead circuit breaker panel.	[B] open the 2-amp GPWS circuit breaker, avionics AC bus #1, Phase C on the navigator's overhead circuit breaker panel when directed by the pilot.	[B] open the 2-amp GPWS circuit breaker, avionics AC bus #1, Phase C on the navigator's overhead circuit breaker panel when directed by the pilot.	

COMBAT ENTRY CHECKLIST (continued)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
11. No Smoking/Seatbelt Lights - "ON" (CP) 12. Survival Equipment - "SECURED" (CP, P, N, LM, S, E)	 5. Survival Equipment - "SECURED" (CP, P, N, LM, S, E)	14. No Smoking/Seatbelt Lights - "ON" (CP) 15. Survival Equipment - "SECURED" (CP, P, N, LM, S, E)	 2. Survival Equipment - "SECURED" (CP, P, N, LM, S, E)
a. Survival Vest b. Flak Vest/Body Armor c. Chemical Defense d. Helmet	a. Survival Vest b. Flak Vest/Body Armor c. Chemical Defense d. Helmet	a. Survival Vest b. Flak Vest/Body Armor c. Chemical Defense d. Helmet	a. Survival Vest b. Flak Vest/Body Armor c. Chemical Defense d. Helmet
13. Observers - "IN POSITION" (LO, RO) The aircraft commander will designate the left and right observers.		16. Observers - "IN POSITION" (LO, RO)	
14. Internal and External Lights - "SET" (CP, P, N, LM, S, E)	6. Internal and External Lights - "SET" (CP, P, N, LM, S, E)	17. Internal and External Lights - "SET" (CP, P, N, LM, S, E)	3. Internal and External Lights - "SET" (CP, P, N, LM, S, E)
NOTE Set the interior lighting to the minimum required.	**NOTE** Set the interior lighting to the minimum required.	**NOTE** Set the interior lighting to the minimum required.	**NOTE** Set the interior lighting to the minimum required.
		18. Depressurization - "COMPLETED" (E)	
		NOTE Ensure rate tape is below 500 ft.	
		19. Air Conditioning Master Switch - AS REQUIRED	7. Loose Items - "SECURED" (LM, S)
		20. Loose Items - "SECURED" (LM, S)	
		21. Combat Entry Checklist - "COMPLETED" (E)	

17.15. COMBAT EXIT CHECKLIST. This checklist returns the C-5 to the normal cruise configuration. Checklist is initiated by the pilot.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "CREW, COMBAT EXIT CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E)	1. "CREW, COMBAT EXIT CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E)	1. "CREW, COMBAT EXIT CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E)	1. "CREW, COMBAT EXIT CHECKLIST" (P) "ACKNOWLEDGED" (CP, N, LM, S, E)
2. Observers - "CLEARED TO REPOSITION" (P) "ACKNOWLEDGED" (LO, RO)		2. Observers - "CLEARED TO REPOSITION" (P) "ACKNOWLEDGED" (LO, RO)	
3. Survival Equipment - "AS REQUIRED" (CP, P, N, LM, S, E)	2. Survival Equipment - "AS REQUIRED" (CP, P, N, LM, S, E)	3. Survival Equipment - "AS REQUIRED" (CP, P, N, LM, S, E)	2. Survival Equipment - "AS REQUIRED" (CP, P, N, LM, S, E)
4. Altimeters - "STATE SETTING" (CP, P, N)	3. Altimeters - "STATE SETTING" (CP, P, N)	4. Altimeters - "STATE SETTING" (CP, P, N)	
5. Continuous Ignition - "AS REQUIRED" (P)		5. Continuous Ignition - "AS REQUIRED" (P)	
6. Internal and External Lights - "SET" (CP, P, N, LM, S, E)	4. Internal and External Lights - "SET" (CP, P, N, LM, S, E)	6. Internal and External Lights - "SET" (CP, P, N, LM, S, E)	3. Internal and External Lights - "SET" (CP, P, N, LM, S, E)
7. IFF - "SET" (CP)		7. IFF - "SET" (CP)	
8. Nav and Comm Radios - "AS REQUIRED" (CP, P)		8. Nav and Comm Radios - "AS REQUIRED" (CP, P)	
9. Radar Altimeters - "AS REQUIRED" (CP, P)		9. Radar Altimeters - "AS REQUIRED" (CP, P)	
10. Radar - "AS REQUIRED" (CP, P, N)	5. Radar - "AS REQUIRED" (CP, P, N)	10. Radar - "AS REQUIRED" (CP, P, N)	
		11. Bleed Air/Pressurization - AS REQUIRED (E) 12. Fuel Panel - SET Return to Normal Fuel Management Sequence.	
		13. Air Conditioning Master Switch - AS REQUIRED 14. EPR/N1 Command Markers -AS REQUIRED	
11. GPWS – "ON" (CP) [B] Close the 2 amp GPWS circuit breaker, avionics AC bus #1, phase C, if previously opened.	6. GPWS Circuit Breaker - CLOSED [B] Close 2 amp GPWS circuit breaker, avionics AC bus #1, phase C, if previously opened.	15. GPWS – "ON" (CP) [B] Close the 2 amp GPWS circuit breaker, avionics AC bus #1, phase C, if previously opened.	
12. No Smoking/Seatbelt Lights - "AS REQUIRED" (CP)		16. No Smoking/Seatbelt Lights -"AS REQUIRED" (CP)	
		17. Fuel Panel - SET a. Main Inboard Boost Pumps - OFF	
		18. Combat Exit Checklist - "COMPLETED" (E)	

Chapter 18

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18.1. This chapter not used for C-5 operations.

Chapter 19

AIRDROP (N/A ANG/AFRC)

Section 19A—Pre-flight Procedures

19.1. General. This chapter describes C-5 weapon system employment during single ship airdrop operations.

19.2. Identification of Airdrop Items:

19.2.1. The ground party may require identification for items that are not dropped or land off the drop zone (DZ) in unsecured areas. Identify supplies or equipment, when requested by the ground party, by the following class numbering system:

19.2.1.1. Class I - Subsistence.

19.2.1.2. Class II - Individual Equipment.

19.2.1.3. Class III - POL.

19.2.1.4. Class IV - Construction Materials.

19.2.1.5. Class V - Ammunition (include type):

19.2.1.5.1. Type "A" - Small Arms.

19.2.1.5.2. Type "B" - Mortars.

19.2.1.5.3. Type "C" - Artillery.

19.2.1.6. Class VI - Personal Demand Items.

19.2.1.7. Class VII - Major End Items (vehicles, howitzers, etc.).

19.2.1.8. Class VIII - Medical Supplies.

19.2.1.9. Class IX - Repair Parts.

19.2.1.10. Class X - Non-Military Programs (i.e. agriculture).

19.2.2. Airdrop loads may also be identified by the following internationally recognized color-coding system for combined operations:

19.2.2.1. Red: Ammunition and weapons.

19.2.2.2. Blue: Fuel and lubricants.

19.2.2.3. Green: Rations and water.

19.2.2.4. Yellow: Communications equipment.

19.2.2.5. White (or red cross on white background): Medical supplies.

19.2.2.6. Black and white stripes: Mail.

19.3. Airdrop Kits. These kits include sufficient equipment to satisfy load or mission requirements. Minimum contents of airdrop kits include cloth-backed pressure sensitive tape, masking tape and an assortment of required nylon, cotton cord and webbing, and an expandable knife set (pole knife). Prior to

starting airdrop checklist, place pole knife next to extraction parachute manual release handle. Knife will remain sheathed except when used.

19.3.1 Aircraft Configuration. Configure aircraft with appropriate aerial delivery system (ADS) equipment to meet mission requirements. Install safety fences only for missions dropping both personnel and equipment on a single flight.

19.4. Joint Airdrop Inspection. Complete the applicable DD Form 1748, **Joint Airdrop Inspection Record**, prior to take-off (see AFJI 13-210, *Joint Airdrop Inspection Records, Malfunction Investigations, and Activity Reporting*, for specifics). The loadmaster will verify the accuracy of cargo and troop documentation, do joint after-loading inspection, and reject loads not rigged in accordance with specific rigging manuals or with inaccurate or unavailable weights.

NOTE:

Equipment not rigged in accordance with 13C-series technical orders (T.O.) or Joint Special Operations Command (JSOC) 350 series manuals require a waiver from HQ AMC/DOK.

19.5. Verification of Load Information. Navigator will verify actual number and type of parachutes, load weight, sequence of extraction, and position of loads in aircraft. Base drop altitude flown on the load or parachute requiring the highest drop altitude.

19.6. Marking Loads. For training drops, e.g. unilateral, exercise, or JA/ATT, the navigator will mark all equipment and standard airdrop training bundles with aircraft call sign and date. If more than one load is dropped on the same pass, mark loads with order of exit from aircraft. Mark extracted end of load and between extraction parachute and attachment to the floor.

19.7. Drop Zone (DZ) Markings. Plan and coordinate DZ markings in accordance with AFI 13-217.

19.8. Night-Vision Goggles (NVG). Airdrop crews may use NVGs for navigating and visually acquiring drop and landing zones; however, approaches, landings, and airdrops using NVGs require a special operations low level (SOLL) II qualified crew. Prior hands-on ground training is required. ***NOTE:*** Only the navigator and pilot not flying the aircraft will use NVGs en route simultaneously in a cockpit that has incompatible lighting. Both pilots may be on NVGs simultaneously if the cockpits are modified with NVG compatible lighting. HQ AMC/DOV/TE and AMWC will determine the compatibility of cockpit lighting.

CAUTION: Glare from incompatible (unmodified) cockpit lighting diminishes NVG effectiveness; however, do not lower cockpit lighting so as to impair crewmember use of instrumentation without NVGs.

19.9. Safety Equipment:

19.9.1. Personnel required to be mobile in the cargo compartment during low-level phases will wear protective headgear (except personnel performing water jumps). Seat all other personnel with their seat belts fastened. Wear a properly fitted flight helmet with chin strap fastened prior to initiating the pre-slowdown checklist and until completion of the post-drop checklist. Lower helmet visors before opening doors when aft of fuselage station 1600.

19.9.2. Wear a parachute or restraint harness aft of fuselage station 1600 with the aft ramp and center door or the paratroop door open. Loadmasters involved in the drop need not hook restraint harness to tiedown ring when aft of fuselage station 1600 while inspecting locks during the slowdown checklist

Loadmasters will wear a restraint harness when performing duties near an open door below 800-feet above ground level (AGL) or above 14,000-feet mean sea level (MSL). Fit restraint harness and adjust length of the lifeline to prevent loadmaster from exiting aircraft. Minimum length of lifeline will be 18-feet 6 inches. Connect lifeline to the cargo floor as follows:

19.9.2.1. For aft cargo door operations, connect lifeline to a tiedown ring on cargo floor forward of the ramp hinge.

19.9.2.2. For paratroop door operations, connect lifeline to the tiedown ring at fuselage station 1920 buttline 67 left or right. For high altitude low opening (HALO) and high altitude high opening (HAHO) airdrops, attachment point will be a location that allows operation of appropriate paratroop door or ramp.

WARNING: During aircrew briefing, aircraft commander will brief loadmasters when mission profile is to be below 800-feet AGL with doors open.

WARNING: Except for an actual contingency, hung jumper, or emergency that threatens the survivability of aircraft and crew, do not disconnect or lengthen restraint harness to a point that would allow the loadmaster to fall outside aircraft.

19.9.3. Connect static lines to the anchor cable before opening paratroop doors.

19.9.4. For static line drops, paratroop doors may remain open with paratroop spoilers and jump platforms extended if all parachutists are hooked up to static line anchor cables or are forward of fuselage station 1600. Do not give control of paratroop door to jumpmaster until all jumpers on that pass are hooked up.

19.10. Secure En Route Communications Package (SECOMP). SECOMP is a dedicated, secure communications system provided by and in support of the user while en route to objective area. Use of SECOMP will cease at the discretion of the aircraft commander if it interferes with aircraft equipment or an aircraft emergency condition.

19.11. Airdrop Weather Minimums. Conduct all drops using visual flight rules (VFR) in accordance with AFI 11-202V3.

Section 19B—Flight Procedures

19.12. General. The tactical or threat situation determines tactics needed for DZ ingress and egress. Crew coordination is essential to accurately position aircraft over the release point. Plan according to **Chapter 16.**

19.13. Tactical Checklists:

19.13.1. Amplified tactical checklists are in the final section of this chapter. Combat entry and exit checklists are in **Chapter 17**. Accomplish combat entry checklist prior to entering tactical environment; accomplish combat exit checklist when leaving tactical environment. These checklists are not reaccomplished while remaining in the environment.

NOTE:

The initiation of any tactical checklist requires an immediate response from all applicable crewmembers. The engineer will challenge any crewmember who fails to respond to a checklist.

19.13.2. During the aircraft commander's crew briefing, pilot, navigator, and loadmaster will

coordinate appropriate times for execution of all tactical checklists. Consider type of load and crew experience level when determining these times. ***NOTE:*** Avoid use of the word "**GREEN**" after combat entry checklist and until completion of post drop checklist. "**GREEN LIGHT**" must be seen or heard by loadmaster for all drops. For personnel airdrops, loadmaster will coordinate visual green light requirement of jumpmaster during pilot, loadmaster, jumpmaster briefing.

19.13.3. The "20-minute," "10-minute," "1-minute," and "10-second" advisories are the minimum required for all personnel and combination airdrops . Only "1-minute" and "10-second" advisories are required for equipment airdrops.

NOTE:

The navigator provides accurate time advisories regardless of the tactical checklist in progress. A five second countdown sequence is optional, but it is an effective technique for ensuring crew coordination and accurate load placement on the DZ.

19.13.4. Loadmaster will advise pilot when an emergency condition exists in the cargo compartment, complete the required emergency checklist, and report completion or status of malfunction checklist. If possible, resume normal tactical checklists.

19.14. En Route.

19.14.1. The entire crew shares responsibility for low-level navigation and check-point identification.

19.14.1.1. Radar altimeter will be on and set to 50-feet below lowest planned altitude for low level flight.

19.14.1.2. Engineer will provide a completed AF Form 4079, **Airdrop Data Card**, no later than the pre-slowdown checklist.

19.14.1.3. Ensure the aircraft is fully depressurized prior to the pre-slowdown checklist.

19.14.2. Time control to objective area should be done primarily by varying airspeed with secondary methods of flying alternate legs, cutting corners, or extending legs. If an orbit is required for timing, see the controlled orbit departure timing graph in AMCP 55-25, *Tactical Mission Considerations*.

19.14.3. Depart initial point (IP) on course, using a drift corrected heading to computed air release point (CARP).

19.14.4. Slowdown:

19.14.4.1. Navigator calls for slowdown at the appropriate time to ensure meeting the time over target (TOT). In-flight changes to planned slowdown time (for timing, threats, etc.) must be coordinated with all crewmembers; however, accomplish slowdown early enough to ensure safe performance of the drop. Make final adjustments no later than 30 seconds before the actual drop.

19.14.4.2. Accomplish slowdown maneuver by retarding all throttles to idle and decelerating to 160 KCAS at navigator's slowdown call. During slowdown, initially set flaps to 40 percent. At appropriate airspeed, the pilot will state "FLAPS (state setting)," the copilot will set the flaps at the required setting and call for the slowdown checklist. Upon reaching 160 KCAS, climb or descend to drop altitude, continue decelerating to drop airspeed as appropriate. Establish drop altitude and drop airspeed no later than 30 seconds prior to the actual TOT.

NOTES:

Accomplish slowdown during personnel drops to allow the jumpmaster access to paratroop door no later than 1 minute prior to actual TOT.

The 'spoiler ratio shifter' lights, on the annunciator panel, could come on when setting the flaps to 80%. This does not represent a malfunction.

19.15. Drop Altitude. Plan drop altitudes in accordance with AFI 11-231.

19.16. Drop Zone (DZ) Communications. Airdrop communication procedures should operate with minimum radio transmissions and calls be made by exception or for safety of flight only.

19.16.1. Drop clearance in VFR is confirmed by observation of the briefed DZ markings.

19.16.2. No-drop or mission cancellation is communicated by the absence of pre-briefed markings (visual or electronic), observation of the block letter "X," red smoke or flare, or by an authenticated radio transmission from the ground party.

19.16.3. Do not make radio calls to determine load information, drop scores, and administrative details unless required for training, evaluation, or off-DZ drops.

19.16.4. Airborne relay of airdrop information to ground commanders may be necessary; during airborne operations, ground commander must be able to determine number and identity of personnel who did not jump.

19.17. Navigation to the Release Point. Run-in sequence:

19.17.1. Navigator updates and briefs planned aircraft position for the CARP, providing parameters to ensure the load impacts on the DZ. Pilot and navigator jointly confirm CARP headings, geographical reference points, and desired aircraft position over the DZ. The pilot is responsible for maintaining desired track across the DZ.

19.17.2. 10 seconds prior to release, the navigator gives a preparatory "10 SECONDS " call.

19.17.3. At release point: navigator states "GREEN LIGHT"; scanner turns on the green light and simultaneously activates chute release switch, if required. Navigator will call "RED LIGHT" at end of usable DZ; scanner will turn off jump signal switch; and the pilot not flying the aircraft initiates the appropriate checklist. Loadmaster will state "ALL CLEAR" or malfunction. For personnel drops, loadmaster will advise pilot of any paratroop delay immediately after drop.

19.18. No-Drop Decisions.

19.18.1. Prior to the 1-minute warning, any crewmember observing a condition that could jeopardize an airdrop or safe extraction will notify the aircraft commander. After the 1-minute advisory, any crewmember observing a condition that could jeopardize a safe drop or extraction will call "NO-DROP" on interphone. Scanner and loadmaster will acknowledge the no-drop call. No airdrop will be done on that pass.

NOTE:

For heavy equipment drops, checklists may still be in progress after the 1-minute advisory. Call a no-drop if checklist items are not completed by the 10-second advisory. For personnel drops, all checklists except the CARP will be completed by the 1-minute advisory or a no-drop will be called. Scanner and loadmaster will acknowledge the no-drop call.

19.18.2. DZ Surface Conditions. For personnel airdrops where surface winds are unknown, advise the jumpmaster or Army airborne mission commander (if designated) when drop altitude winds exceed 30 knots. The decision to drop is at user discretion.

19.18.2.1. During joint training operations, the drop zone control officer (DZCO) will determine suitability of DZ surface conditions prior to TOT.

19.18.2.2. For Air Force only jumps, the AF DZCO is primarily responsible for determining surface conditions in conjunction with the combat control team (CCT).

19.18.3. When a no-drop is called:

19.18.3.1. Personnel: complete the post-drop checklist.

19.18.3.2. Equipment: see paragraph **19.56**.

19.19. Drop Zone Escape Procedures. Escape maneuver begins at "ALL CLEAR" or "RED LIGHT" call, whichever is later. The pilot not flying the aircraft initiates the post-drop checklist. Climb or descend to en route altitude, turn to departure heading, and increase airspeed to 160 KCAS (do not exceed 160 KCAS until all doors are closed).

19.20. Drop Zone Racetrack Procedures. Racetracks are authorized for personnel airdrops only (this includes personnel portion of a combination drop). If flying a racetrack, accomplish appropriate checklists beginning with post-drop checklist and followed by the slowdown checklist, in sequence. Do not compress 1-minute advisory. After gaining control of paratroop doors from jumpmaster, loadmasters will not allow the jumpmaster access to doors until completion of slowdown checklist. Brief crew on racetrack intentions prior to takeoff.

NOTE:

Aircraft commander will ensure that loadmaster has adequate time to reconfigure for the next drop.

19.20.1. Fly racetracks at 160 KCAS with flaps remaining at drop setting, from "RED LIGHT" until wings level on the run-in for the next pass. Paratroop doors may be left open with air deflectors and jump platforms extended, provided all troops aft of fuselage station 1600 are hooked to anchor cables or seated with seatbelts fastened.

19.20.2. Retrieve static lines until they are inside the aircraft and forward of the air deflectors. On multiple passes, manually pull the static lines forward or remove them to allow jumpers to hook up.

WARNING: Do not disconnect lifelines to retrieve static lines.

Section 19C—Methods of Aerial Delivery

19.21. General. Refer to AFI 11-231, *Computed Air Release Point (CARP),* for computation methods in performing following types of aerial delivery.

19.21.1. CARP and HARP (High Altitude Release Point). CARP is a computation based on parachute ballistics and dead reckoning to determine the release point for low altitude airdrops. HARP is for high altitude airdrops.

19.21.2. Methods of visual airdrop include visual and sight angle, ground marked release system (GMRS), verbal initiated release system (VIRS), and jumpmaster-directed.

19.22. GMRS. Supported ground forces are responsible for computing and placing release point on the

DZ. This airdrop is made abeam a flanker marker determined during joint planning. Aircrew procedures are the same as those employed during a standard drop. Navigator computes CARP or sight-angle position to project approximate location of release point and to facilitate line-up during run-in.

NOTES:

The inverted "L" has not been validated for the C-5 due to problems in maintaining visual contact with the marker. Crew and user must coordinate procedures if the ground party plans on using it.

User assumes responsibility for drop accuracy.

19.23. VIRS.

19.23.1. During VIRS, ground personnel provide verbal steering guidance to aircraft and call the release when the aircraft arrives over a predetermined release point by using the following terminology:

19.23.1.1. "TURN LEFT/RIGHT"—use a half standard rate turn unless otherwise specified.

19.23.1.2. "STOP TURN"—self explanatory.

19.23.1.3. "STANDBY"—indicates approximately 10 seconds prior to the release.

19.23.1.4. "EXECUTE, EXECUTE, EXECUTE"—directs release of the load.

NOTE:

VIRS is performed by qualified CCT or tactical airlift liaison officer (TALO) only.

19.23.2. Upon hearing the term "STANDBY," the navigator states, "10 SECONDS" on interphone. On the first "EXECUTE," the navigator calls "GREEN LIGHT," and the scanner activates the green light switch and the ADS switch, as required.

19.23.3. The ground party maintains positive visual contact with the aircraft during the inbound approach.

NOTE:

The ground party accepts responsibility for drop accuracy.

19.24. Jumpmaster-Directed Airdrop. These drops are performed single ship, by qualified Army or Air Force jumpmasters (or trainees under the supervision of qualified personnel); however, procedures are further restricted to CCT and pararescue forces or special operations (SOF) training only, in preparation for jumps from allied aircraft not equipped with navigation or CARP capabilities. The following conditions apply.

19.24.1. Personnel will not exit the aircraft until green light is illuminated.

19.24.2. Navigator calculates a CARP or HARP for each drop.

19.24.3. Coordinate in-flight visual signals, verbal signals, and interphone procedures among jumpmaster, loadmaster, navigator, and pilot prior to drop.

19.24.4. After completing slowdown checklist, loadmaster permits jumpmaster to begin "spotting procedures." Jumpmaster visually relays steering signals to loadmaster, who verbally relays these signals to pilot. Jumpmaster may spot from aircraft ramp or paratroop door. Scanner turns on "GREEN LIGHT" 1 minute prior to navigator's release point to indicate clearance for jumpmaster to determine exact exit point. When further exit of jumpers becomes unsafe (aircraft emergency or similar

circumstances), turn on "RED LIGHT."

NOTE:

Jumpmaster's parent service accepts responsibility for drop accuracy.

19.25 through 19.30. ***Not used.***

Section 19D—High Altitude Airdrop Procedures

19.31. General. Use high altitude low opening (HALO) and high altitude high opening (HAHO) procedures for drops above 3,000-feet AGL and/or 10,000-feet MSL. For drops above 10,000-feet MSL, only essential personnel who have accomplished appropriate physiological training are permitted on mission aircraft. Until stall data is developed, HALO and HAHO operations above 16,000-feet MSL require HQ AMC/DOV approval.

19.32. ***Not used.***

19.33. Oxygen Requirements.

19.33.1. Oxygen will be used for all unpressurized flights above 10,000-feet MSL. ***EXCEPTION:*** Jumpers may operate without supplemental oxygen during unpressurized flights up to 13,000-feet MSL provided time above 10,000-feet MSL does not exceed 30 minutes each sortie. Jumpmasters may operate without supplemental oxygen for an additional 60 minutes within the 10,000 to 13,000 foot envelope, provided their duties during this period do not include jumping. Supplemental oxygen must be used in all instances for unpressurized flights above 13,000-feet MSL. When dropping from 18,000-feet MSL or higher, use prebreathing procedures. Sufficient oxygen regulators must be provided for all personnel onboard. If aircraft oxygen system does not provide adequate regulators, pre-flight and install an approved portable oxygen console in the aircraft. Primary source of oxygen for loadmasters in the cargo compartment will be an approved portable oxygen console or twin "53" walk-around bottles. The use of MA-1 portable oxygen bottles is unacceptable.

19.33.2. For operations above 10,000-feet MSL, provide an MA-1 portable oxygen bottle with A-21 regulator for each person (excluding jumpers) aboard the aircraft who cannot use the aircraft oxygen system.

NOTE:

The quick-don oxygen masks are not approved for operations above 10,000-feet MSL.

19.33.3. All airdrops above 25,000-feet MSL require a waiver to AFI 11-202V3, for unpressurized flight, from HQ USAF/DOORF through HQ AMC/DOV.

19.33.4. Crews flying high altitude airdrops will comply with oxygen mask requirements in AMCI 11-301, AMCI 11-301, *Aircrew Life Support (ALS) Program*.

19.33.5. All personnel will pre-breathe 100 percent oxygen at or below 10,000-feet MSL on any mission scheduled to drop at or above 18,000-feet MSL. Complete pre-breathing before cabin altitude ascends through 10,000-feet. All crewmembers will remain on 100 percent oxygen until cabin altitude is below 10,000-feet. A break in pre-breathing requires the pre-breathing period to be restarted. When pre-breathing on the ground is required, a launch crew may assist the primary crew as needed. Plan pre-breathing start time based on the following chart.

NOTE:

Quick-don oxygen masks are not approved for pre-breathing or for use during high altitude operations (at or above 18,000-feet).

Figure 19.1. Uninterrupted Pre-breathing and Exposure Limitation Times.

Drop altitude MSL	Pre-breathing time crew and jumpers	Exposure time per sortie	Sorties per 24-hours
FL 180 to, but not including FL 250	30 minute/30 minute	2-hours	1
FL 250 to but not including FL 300	HALO 45-minute/30 minute HAHO 45-minute/45 minute	1-hour	1
FL 300 to but not including FL 350	60 minutes/60-minutes	30-minute	1
FL 350 and above	75 minutes/75-minutes	30-minute	1

NOTE:

Exposure limits are for time above 10,000 MSL.

WARNING: Do not expose personnel to 30,000-feet MSL or above more than three times each 7 days and ensure a minimum of 24 hours between exposures.

19.33.6. The jumpmaster may dictate use of supplemental oxygen by any or all jumpers at altitudes less than those listed. Transfer from the aircraft oxygen system or supplemental oxygen consoles to a personal system for deployment no later than 1 minute prior to the "GREEN LIGHT."

19.33.7. Pressurization Scheduling. Maintain cabin pressure at or below 10,000-feet until the pre-slowdown checklist (time for check may have to be adjusted) or pre-breathing is complete. Depressurization will not exceed 3,000-feet per minute. Slower rates are recommended if time allows. Assure zero differential 10 minutes prior to scheduled TOT.

19.34. ***Not used.***

19.35. Physiological Technician (PT) Requirements. PTs will provide high altitude airdrop mission support when requested by the mission frag, the aircrew, or the user. A minimum of two PTs will be on all airdrops conducted at 18,000-feet MSL or above. Additional PTs will be required when PTs need training, a waiver is granted to exceed exposure limitations, or if the number of jumpers exceeds 16. One PT is required per 16 jumpers, up to a maximum of 3 PTs.

NOTE:

The Command Coordinator, Aerospace Physiology, HQ AMC/SGPT, 89th Medical Group, Andrews AFB MD (DSN 858-4654) may authorize variations to the PT-to-jumper ratio.

19.36. PT Duties. PTs will fly as crewmembers as stated on aeronautical orders. A PT will be on interphone at all times. Duty station in flight is as required to monitor crew, jumpers, and oxygen equipment. The PTs will act as an advisor to the pilot, pre-flight, as practical, (aircraft and supplemental oxygen equipment), and advise or aid the loadmaster in positioning and securing oxygen equipment.

19.36.1. Prior to the first sortie, PT will brief aircrew and jumpers on physiological problems that may be encountered, importance of proper pre-breathing, effects of wind blast and cold air exposed tissue, and any special requirements.

19.36.2. Additionally, PT will monitor personnel, aircraft, and supplemental oxygen/life support equipment in flight. The AMC Coordinator, Aerospace Physiology, will provide the PT with a list of equipment and supplies to be carried on board each flight, records to be kept, and briefing to be given by the PT to the jumpers and aircrew.

NOTE:

Notify HQ USAF/SGPA (DSN 297-1858), HQ AMC/SGPA (DSN 576-2303), HQ ACC/SGPA (DSN 574-7874, extension 2159), and 1 AMDS/SGPT (DSN 574-7827) by the most expeditious manner of any physiological incident.

19.37. Conduct of Operations. Conduct all HALO and HAHO operations according to the amplified checklist in this chapter. Maintain interphone contact between the cockpit and cargo compartment (pilot and loadmaster) from takeoff until completion of the post-drop checklist and the cabin altitude is below 10,000-feet. The flight engineer provides drop speed, shaker speed (30 degrees bank), military rated thrust (MRT), and flap retract speed.

19.37.1. Briefing requirements. In addition to the PT and pilot-jumpmaster briefing, pilot will brief jumpmaster on pre-breathing start time, emergency descent procedures, time to descend to 10,000-feet, and pressurization schedule. Pilot will also brief expected DZ markings, HARP, prominent terrain and cultural features, and "GREEN LIGHT" duration.

19.37.2. User determines DZ requirements and markings. However, drop zones must be established to ensure accurate navigation to the HARP. Positive visual or electronic (radar, TACAN, VOR/DME, etc.) identification of the HARP is required for high altitude drops.

19.37.3. There are no altitude wind restrictions for personnel HALO and HAHO operations. AFI 13-217 contains surface wind restrictions.

19.37.4. Drop altitude is based on mission requirements, terrain features, weather conditions, and threats.

19.37.5. Drop airspeed will be 1.3 Vs for 80 percent flaps—130 KCAS minimum; 180 KCAS maximum.

19.37.6. Complete the slowdown and configure not later than 3 minutes prior to the scheduled drop time. Use 80 percent flaps.

WARNING

1.3 Vs for zero flaps must not exceed 215 KCAS/.45M.

19.37.6.1. Paratroop door exit—paratroop doors open, deflectors and jump platforms extended (as required).

19.37.6.2. Ramp exit—pressure and center doors open, ramp extended.

WARNING

Do not make static line jumps over the cargo ramp.

19.38. High Altitude Personnel Procedures. Perform drops using either HARP or jumpmaster-directed procedures.

19.38.1. At the pre-slowdown checklist, navigator should provide updated winds and weather

conditions to jumpmaster. Notify jumpmaster of any deviations from the brief, such as altitude, run-in track, or release point. Depressurize cabin to 10,000-feet so that jumpers can arm parachutes. Repressurization after drop will be consistent with mission requirements. Normally, cabin altitude should return below 10,000-feet as soon as practical.

CAUTION: Ensure any parachutists remaining on board de-arm their chutes before cabin altitude descends below set activation altitude. Activation altitude will be coordinated between the pilot, loadmaster, and jumpmaster prior to takeoff.

19.38.2. Interphone and hand signals will be primary methods of communication. The loadmaster will coordinate and use hand signals with jumpmaster. Loadmasters give time warnings to jumpmasters by pointing to their watch and indicating the correct warning with their fingers. Indicate wind velocity on DZ by cupping one hand in front of the oxygen mask or mouth then indicating with upturned fingers the speed of the wind. Indicate a no-drop by passing the forefinger across the throat. Each loadmaster will carry pencil and paper to write out messages that cannot be understood with hand signals. Write out messages from the jumpmaster for relay to pilot.

19.38.3. For jumpmaster-directed HALO drops, the green light may be turned on 1 minute prior to release point. Navigator will provide a standard "GREEN LIGHT" call at the jointly agreed upon release point.

19.39. ***Not used.***

Section 19E—Airdrop Load Procedures

19.40. Personnel Drops:

19.40.1. Accomplish low altitude personnel drops from paratroop doors.

WARNING: Do not make static line jumps over the ramp.

NOTE:

If a paratroop door, air deflector, or jump platform malfunctions, the door on the affected side will not be opened. Troops may be safely dropped from the operational side of the aircraft with the concurrence of the jumpmaster. If repairs cannot be accomplished, subsequent drop sorties are at the discretion of each jumpmaster.

19.40.2. Aircraft commander, navigator, loadmaster, and jumpmaster will accomplish associated briefings prior to takeoff.

19.40.3. Jumpmaster and loadmaster paratroop door procedures are as follows:

19.40.3.1. Primary loadmaster allows jumpmaster access to troop doors no later than "1-minute" advisory. Loadmasters then take a position so as to provide maximum maneuverability for jumpmasters and safety noncommissioned officers to perform their duties.

19.40.3.2. At "RED LIGHT," primary loadmaster notifies jumpmasters or safety personnel of the red light condition that should halt the drop. On training missions, if jumpers continue to exit aircraft after "RED LIGHT," loadmaster will take no further actions other than to count number of jumpers that exited after "RED LIGHT."

WARNING: Do not attempt to physically stop or hinder jumpers from exiting aircraft if jumpers continue to exit after "RED LIGHT."

19.40.3.3. Control of paratroop door reverts to the loadmasters after all jumpers have exited or remaining jumpers have been stopped by the jumpmaster or safety noncommissioned officer and cleared from paratroop door area.

NOTE:

For racetracks, loadmaster retains control of paratroop doors until completion of next slowdown check.

19.40.4. For mass paratroop airdrops, use the following procedures:

19.40.4.1. Coordinate loadmaster and jumpmaster in-flight procedures during the pilot, navigator, loadmaster, jumpmaster briefing.

19.40.5. Racetracks are authorized if directed by mission tasking or mutually agreed to by unit commanders. Paragraph **19.20** contains the procedures.

19.40.6. Static line retrieval. Do not increase airspeed above 160 KCAS until all static lines are retrieved, jump platforms and air deflectors are stowed, and paratroop doors are closed. Retrieve static lines as soon as possible after the drop. The primary method of retrieval is the static line retriever winch. Use the cargo winch only as an emergency backup and do not preposition cable. During training, if static lines cannot be retrieved, cut them over government property. During contingency operations, cut them immediately if they can't be retrieved.

NOTE:

Retrieve no more than 20 static lines per door by hand. When 20 or less static lines are manually retrieved, jump platforms may be left extended. However, if retriever winch is used, retract jump platforms.

19.41. ***Not used.***

19.42. Combination Drops. Combination drops are when jumpers exit from aircraft after extracted equipment. Personnel may immediately follow equipment using freefall or may jump static line following a race track or jump-pilot maneuver.

19.42.1. Restrictions. If personnel immediately follow their equipment, determine aircraft drop altitude and airspeed by the item (equipment or personnel) requiring the highest drop altitude and airspeed. Jumpers exiting over the ramp will free fall.

19.42.2. Procedures. Navigator computes both a platform and personnel CARP. If personnel immediately follow their equipment, plan 10 seconds after equipment release point using same airspeed and altitude. Inform jumpmaster if PI falls within 150 yards of the DZ boundary. Jumpmaster is final approving authority in this situation.

19.42.3. Heavy Equipment and Personnel Combination Airdrop (HEP Combo). HEP combo airdrop requires two passes over DZ or two separate DZs. The tactical situation determines direction of second pass and time between passes. For the same DZ, align the aircraft over the DZ using either a racetrack or pilot-jump maneuver. Coordinate the time between the drops among the loadmaster, jumpmaster, and pilot. Minimum time (normally 6 minutes from green light to green light) is determined by time needed to acquire DZ and properly align aircraft over the PI. Altitude and airspeed changes for personnel drop may be done anytime after turn away from first DZ.

19.43. Jump-Pilot Maneuver Airdrop. These airdrops provide a method for personnel to follow

extracted equipment at low altitude. This maneuver consists of a 90-degree turn initiated after the airdrop load clears the ramp, followed by a 270-degree opposite direction turn that positions the aircraft over the original drop point, headed in the opposite direction. Although primarily developed for static line personnel airdrops following water craft drops (boats rigged for heavy equipment), the maneuver may also be used for free-fall jumpers.

19.43.1. Restrictions:

19.43.1.1. Heavy equipment extractions are restricted to only EFTC extraction systems.

19.43.1.2. Single-ship operations only.

19.43.1.3. Determine drop altitude by the item (personnel or equipment) requiring the highest drop altitude.

19.43.2. Procedures. Use the HEP combo checklist. While approaching DZ, configure aircraft as required for drop. At pre-slowdown call, jumpers stand up and hook up to anchor cable. The equipment is extracted or released on "GREEN LIGHT" call. On hearing "ALL CLEAR," scanner turns the red light on. Simultaneously:

19.43.2.1. The pilot turns 90 degrees off DZ axis.

19.43.2.2. Loadmasters reconfigure aircraft in accordance with HEP combo checklist if jumpers exit from paratroop doors. If jumpers will freefall over ramp, maintain the equipment configuration.

19.43.2.3. The pilot then performs a 270-degree opposite direction turn to reposition the aircraft over the DZ. A second "GREEN LIGHT" indicates to the jumpmaster clearance to drop.

19.43.2.4. Jumpers exit the aircraft on jumpmaster command with the red light turned on at the end of the usable DZ. Make the initial pass downwind if operational constraints allow; however, if the initial pass is made into a head wind, delay the 90-degree turn 1 second for each knot of head wind to ensure the turn back to the target area provides time to configure the paratroop door and acquire the DZ. The time from load exit to paratroop exit is 2 to 3 minutes, depending on the type of equipment dropped.

19.44. Door Bundles.

19.44.1. A-7 or A-21 containers weighing up to 500 pounds (excluding the weight of the parachute) are referred to as door bundles and will be dropped from the aircraft through the paratroop door using the personnel airdrop checklist. Door bundles may be dropped independently or in conjunction with personnel; bundle airdrops are limited to one bundle per paratroop door used. When dropped with personnel, the bundle will be the first object to exit the aircraft. Remove restraints and position the bundle in the paratroop door prior to completion of the slowdown checklist. ***EXCEPTION:*** If the jumpmaster needs the paratroop door for spotting, place the door bundle as close as possible to the paratroop door. If jumpers are to follow the door bundle, the user is responsible for ejecting the bundle out of the paratroop doors.

19.44.2. During unilateral training, no door bundle will exit an aircraft after a parachutist has jumped.

19.44.3. During joint training, contingency, or emergency operations, the using agency determines the requirement to airdrop door bundles from any or all aircraft.

19.44.4. When door bundles are dropped with personnel, compute CARP for the first parachutist exiting after the bundle and an additional CARP for the door bundle to ensure that it will impact within

DZ boundaries. Release the bundle at the personnel CARP, followed by the jumpers when the door is clear.

19.44.5. Restrictions. The maximum weight for a door bundle is 500 pounds, excluding the weight of the parachute. However, if the load weighs more than 350 pounds, three trained and designated pushers must be present to eject or assist in ejecting the load from the aircraft. The dimensions, including the parachute, must not exceed 48 X 30 X 66 inches unless specified in specific rigging manual. Place the largest dimension in the upright position. Do not rig door loads with breakaway static lines. When containers are being dropped, configure the aircraft for personnel.

19.45. Equipment Drops.

19.45.1. Only equipment rigged in accordance with 13-C series technical orders or JSOC 350 series may be airdropped. Aircraft are limited to a maximum of 60,000 pounds for a single platform.

19.45.2. Open aft cargo door and ramp in flight using manual override only during in-flight emergencies. In-flight unlocking and opening of cargo doors and ramp using normal (electrical) procedures and closing using manual override is authorized. Flight engineer will have manual override procedures immediately available. If required, flight engineer will read procedures over interphone. Loadmasters will operate and close doors and ramp.

19.46 through 19.50. ***Not used.***

19.51. Standard Airdrop Training Bundle (SATB).

19.51.1. The 15-pound SATB may be dropped to simulate personnel or heavy equipment. Operate SATB missions at the altitude and airspeed specified for the drop being simulated. Assemble and identify training bundles in accordance with T.O. 13 C7-1-11, chapter 13. Do not rig training bundles with breakaway static lines. See addenda B for specific rigging and inspection procedures.

19.51.2. Anchor cables are not required when simulating personnel or equipment drops. Jump platforms are not required when simulating personnel drops.

Section 19F—Emergency Procedures

19.52. General: If a malfunction occurs, the loadmaster notifies the pilot and immediately takes the appropriate action. All crewmembers should review the applicable emergency procedures for the airdrop to be performed prior to takeoff. Loadmasters will conduct detailed emergency briefings prior to departure.

19.53. Emergency Airborne Bail Out Procedures.

19.53.1. Acceptable Conditions. If an aircraft emergency occurs and jumpers are standing, hooked to the anchor cable, and conditions permit then:

19.53.1.1. Maintain a minimum of 400-feet AGL to allow jumpers to evacuate the aircraft. If the jump must be made in excess of 150 KCAS, advise the jumpmaster of both airspeed and altitude.

19.53.1.2. Evacuate the aircraft by giving the signal for bail out.

NOTE:

If the aircraft commander determines there is enough time to get jumpers standing and hooked up, this also constitutes acceptable conditions.

19.53.2. Unacceptable Conditions. If conditions are not acceptable for aircraft evacuation or the drop is aborted for other reasons then:

19.53.2.1. Turn on the red light until the exit door is closed.

19.53.2.2. The pilot advises the loadmaster, who in turn advises the jumpmaster to have jumpers unhook, take their seats and strap in.

19.54. Fouled and Towed Parachutist.

19.54.1. The jumpmaster will stop remaining jumpers from exiting the aircraft and the loadmaster notifies the pilot of a towed parachutist.

19.54.2. The scanner turns on the red light which is confirmed by the copilot.

WARNING: When towing a jumper, avoid any unnecessary turns. If a turn is necessary, ensure it is coordinated and use a shallow bank angle (approximately 10 degrees). Turning into or away from the jumper does not matter providing the turn is coordinated. Maintain at least the minimum drop altitude (AGL) for the type parachute being used. Avoid flying over or upwind of water or build-up areas. Do not exceed 135 KCAS.

19.54.3. Loadmaster allows jumpmaster access to the door to identify how jumper is being towed. If towed by anything other than static line, jumpmaster will attempt to free parachutist. If all jumpers have exited aircraft and there is no safety on board, this responsibility rests with the loadmaster. The jumper will indicate consciousness and a ready reserve chute by staying in a tight body position, keeping both hands on the reserve chute. This indicates jumper is prepared to be cut away. Loadmaster relays this to pilot, who makes the actual decision. On pilot's command, loadmaster cuts jumper's static line. Priority is to retrieve jumper versus cutting static lines.

19.54.4. If the jumper is to be retrieved, the loadmaster installs the retrieval bar, retracts the jump platform and initiates retrieval while ensuring personnel stay clear of the door and static line retrieval cable. When the jumper has been retrieved to the door, the jumpmaster and safety (or both loadmasters when jumpmaster or safety are not on board) gain physical control of the jumper. The loadmaster relieves tension from the static line retriever so that the jumper can be brought inside the aircraft.

WARNING: During retrieval, do not allow the jumper to slip back into the air stream.

19.55. HEP Combo Emergency Procedures. In the event of a malfunction, follow the appropriate emergency checklist (equipment or towed jumpers).

19.56. Heavy Equipment.

19.56.1. When notified of a malfunction, the pilot maintains drop airspeed and altitude, avoids populated areas, and also avoids yawing the aircraft until the load is restrained. These emergency procedures apply to the platform being dropped on that pass and do not pertain to the whole load, i.e. when the emergency procedure requires restraint devices on the forward platform, it means the forward platform being dropped on that pass. Do not consider platforms aboard the aircraft for subsequent drops in the primary emergency action unless they are a cause of the emergency.

WARNING: Apply emergency aft restraint in accordance with T.O. 1C-5A-9, section VII. If extraction force is applied to the load, connect emergency restraint to the load. If extraction force is applied to the platform, connect restraint to the platform. Apply required restraint simultaneously.

WARNING: Secure load prior to proceeding aft of load inside safety fence (chains and devices will be

tight). If access is not restricted by the safety fence, restrain only the platform with the emergency condition .

19.56.2. When any of the following conditions occur, complete the equipment malfunction checklist (**11-2C-5V3-CL-4**).

19.56.2.1. Loose Platform - A loose platform occurs when the left detents release the platform prior to "GREEN LIGHT." If this condition exists, call “loose platform” and complete the equipment malfunction checklist. Do not attempt further airdrops.

19.56.2.2. NO-DROP - If a no-drop is called after completing the slowdown checklist, loadmaster 2 will return the shift lever on the left hand rails to "SECURE." Operate the master control handle until the appropriate number on the rack assembly is aligned with the "SAFE" arrow. Loadmaster 3 will attempt to lock the right hand locks. If the locks return to the "SAFE" position, or the right locks are locked, complete the appropriate items on the post-drop checklist. If unable to secure platform with either left or right hand locks, complete the equipment malfunction checklist. After the aft doors are closed and both left and right hand locks are returned to the SAFE and locked positions further drops may be attempted but appropriate checklists must be redone.

19.56.2.3. Extraction parachute holder fails to release - If the parachute fails to release electrically, use the manual release. If the manual release fails, complete the equipment malfunction checklist and do not attempt further drops.

19.56.2.4. Extraction Parachute Failure - If the extraction parachute fails to open, cigar rolls, or blows out, call “malfunction” and complete the equipment malfunction checklist.

19.56.2.5. Extraction parachute fails to release the load:

19.56.2.5.1. If on a single platform, move the master control handle on the left rails until the number "1" on the rack is aligned with the "RELEASE" arrow. Use numbers 2, 3, and 4 as required on multiple passes. If the platform still does not extract, complete equipment malfunction checklist. Do not attempt further airdrops.

19.56.2.5.2. If on a sequential drop, complete the equipment malfunction checklist. Do **not** release the left hand rails unless the extraction parachute fails to extract the last platform of the sequential drop. Do not attempt further drops.

19.57 through 19.59. ***Not used.***

19.60. SATB Emergency Procedures:

19.60.1. SATB (Personnel). SATB fails to separate from static line after deployment outside the aircraft:

19.60.1.1. The loadmaster cuts the static line on the pilot's command.

19.60.1.2. Notify pilot when malfunction checklist is completed.

19.60.2. SATB (Equipment):

19.60.2.1. If the extraction parachute holder fails to release the SATB electrically and manually, the scanner returns ADS arming switch to "SAFE." The loadmaster returns extraction parachute manual control handle to "SAFE", and notifies the pilot that the malfunction checklist is complete.

NOTE:

Isolate and correct the cause of the malfunction before attempting further drops.

19.60.2.2. SATB towed or hung:

19.60.2.2.1. The loadmaster cuts the static line on the pilot's command. Do not retrieve the SATB.

19.60.2.2.2. Loadmaster will advise the pilot when the malfunction checklist is completed.

NOTE:

Isolate and correct the cause of the malfunction before attempting further drops.

19.61. High Altitude Emergency Procedures.

19.61.1. If a physiological incident occurs, the aircraft commander will:

19.61.1.1. Abort the mission.

19.61.1.2. Descend (determine pressurization and descent by the type and degree of sickness or pain).

19.61.1.3. Ensure the affected person remains on 100 percent oxygen until a medical doctor can determine the type treatment required.

19.61.1.4. Proceed to the nearest base with qualified medical assistance available.

19.61.1.5. Advise the control tower of the emergency and request an ambulance to meet the aircraft.

19.61.1.6. Advise medical attendant to notify Brooks AFB Hyperbaric Medicine (DSN 240-3281/3278, commercial 210-536-3281/3278).

19.61.2. Parachute and Safety Harness. Crewmembers engaged in airdrop activity will wear parachute or restraining harnesses in the cargo compartment any time the doors are open. Safety harnesses will be worn on airdrops conducted above 14,000-feet MSL. ***EXCEPTION:*** PTs may wear a parachute on drops above 14,000 MSL.

Section 19G—Combat Airborne Operations

19.62. General. This section describes combat airborne operation techniques that cannot be used in peacetime tactical training due to safety restrictions. This is information extracted from FM 57-230 /T.O. 14D1-2-1-121, chapter 22. It is written by the Army for use by Army ground commanders, but can affect AMC aircrews during combat operations. Army ground commanders have the flexibility to modify these procedures. Therefore, a thorough briefing between AMC combat mission planners, aircrews, and the supported Army commander is essential. (Items in this section marked with an asterisk differ in wording from the original text but reflect the intent.)

19.63. Personnel Combat Airdrops.

19.63.1. Aircraft commanders, navigators, and loadmasters must know and understand the Army commander's jump plan. Personnel and equipment can be dropped in any sequence that best supports the ground tactical plan. Commanders may disregard peacetime aircraft, serial, and formation interval rules (as it applies to time intervals between drops).

19.63.2. After the flight crosses into enemy territory or approaches enemy air defense missile and gun systems, jumpmasters stand up and hook up the troops. If it is a long way to go after hookup and

equipment checks, parachutists sit on the floor; static lines are tightened after they stand up again. Therefore, if an aircraft is hit, the parachutists can immediately exit.

19.63.3. The navigator will compute CARP based on the ground commander's desired point of impact. The red light will be turned on at the end of the usable DZ time. Computation of CARP and red light are made without regard for safety (buffer) zones. Parachutists will continue to exit after red light until all jumpers are clear.

19.63.4. The weapons are rigged (magazine is loaded, on SAFE, and no round is chambered) in the M1950 weapons case. Handles of hand grenades are bent down to prevent falling off when the parachute opens.

19.63.5. There may or may not be safeties - each trooper is his own safety. All troops on board jump.

19.63.6. Jumpmaster and assistant jumpmasters jump in that part of the stick where they can land with their assigned unit.

19.63.7. Towed parachutists are automatically cut free. Jump doors are closed immediately so the aircraft formation can pick up speed to escape and evade back to friendly lines.

19.63.8. Drop altitude is determined between the airborne commander and the air mission commander. The JTF commander makes the final jump altitude decision.

19.63.9. Regardless of type parachute, ADEPT or any other form of controlled exit will not used. T-10B and MC1-1B/C parachutes may be mixed in any order, in any aircraft, day or night.

19.64. Equipment Combat Airdrops.

19.64.1. All aircraft are loaded to the maximum.

19.64.2. The minimum essential heavy equipment loads should precede the personnel drop. Other important equipment should follow the assault personnel drop as soon as possible. Units cannot fight without heavy weapons, vehicles, and ammunition bundles. There is no minimum time required between a personnel drop and a later heavy equipment drop.

Section 19H—Airborne Checklists

19.65. Crewmember Airdrop Amplified Checklists.

19.65.1. Prior to initiating the pre-slowdown checklist, flight engineer will provide pilots with completed Airdrop Data Card. Flight engineer reads all checklists, reading applicable items for type of airdrop performed.

19.65.2. The combat entry and exit checklists are included in this volume, and are performed for all tactical missions prior to initiating the pre-slowdown checklist.

NOTE:

Navigator calls all time advisories at appropriate time, regardless of checklist being run. Loadmaster will advise jumpmaster at twenty-, ten-, and one-minute and ten-second advisories on navigator's call.

CAUTION: During all airdrop operations, after the landing gear warning horn circuit breaker is open and the flaps are extended to 80%, it is possible the spoiler ratio shifter lights may illuminate. Roll control should not be affected; however, a failure of the spoiler ratio shifter may go undetected until the post-drop checklist is completed.

19.66. Airdrop Personnel Checklist—Personnel Pre-Slowdown.

19.66.1. Complete this checklist prior to slowdown. The navigator will initiate the checklist by stating "PRE-SLOWDOWN CHECKLIST." Coordination between the pilot, navigator, and loadmaster will determine the time required to prepare the load for airdrop and the initiation time of the pre-slowdown checklist by the navigator.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "PRE-SLOWDOWN CHECKLIST" (N) "PERSONNEL PROCEDURES" (P) "ACKNOWLEDGED" (LM 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "PERSONNEL PROCEDURES" (P) "ACKNOWLEDGED" (LM 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "PERSONNEL PROCEDURES" (P) "ACKNOWLEDGED" (LM 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "PERSONNEL PROCEDURES" (P) "ACKNOWLEDGED" (LM 1, E)
		2. Jump Signal Caution Light switch - "ON" (S)	2. Lights - CHECKED/SET (LM 2, 1) a. Jump Signal Light - RED b. Jump Platform Lights - ON (night drops only) c. Curb Lights - OFF d. Cargo Compartment Lights - AS REQUIRED
2. Paratroop Air Deflector Switch - "ARMED" (CP)		3. Paratroop Air Deflector Switch - "ARMED" (CP)	3. Bundle Marker Lights - AS REQUIRED (LM 2, 1) (night drops only)
4. Command Markers - "SET" (CP, P, E)		4. Landing Gear Warning Horn C/B - "OPEN" (S) 5. Command Markers - "SET" (CP, P, E) 6. Depressurization - "COMPLETED" (E)	4. Parachute/Safety Harness - ON (LM 2, 1) **WARNING** Ensure all personnel in the cargo compartment don parachute and safety harness as applicable. 5. Outflow Valve - CHECKED (LM 2, 1) - Visually check outflow valve to ensure it is in the full open position.
5. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	2. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	7. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	
		8. Pre-Slowdown Checklist - "COMPLETED" (LM 1, E)	6. Pre-Slowdown Checklist - "COMPLETED" (LM 1, E)

19.67. Airdrop Personnel Checklist—* Slowdown Checklist.

19.67.1. This checklist will be initiated after flaps and slats have been extended to final airdrop setting during slowdown maneuver. Flaps will initially be set to 40 percent, then to final airdrop setting. Pilot not flying aircraft will initiate checklist by stating final flap and slat position indicator reading followed by "SLOWDOWN CHECKLIST."

PILOT	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 1, E)	1. "SLOWDOWN CHECKLIST" (CP) "ACKNOWLEDGED" (LM 1, E)
	2. Floor Heat and Air Conditioning Master Switches - OFF	2. Jumpmasters - ALERTED
2. Paratroop Doors - "CLEARED TO OPEN" (P) "OPEN" (LM 1)	3. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	3. Paratroop Doors - "CLEARED TO OPEN" (P) "OPEN" (LM 1) **WARNING** Paratroop doors will not be opened until directed by pilot. Ensure all static lines for troops dropped on that pass are attached to anchor cable. ***NOTE*** Jump platforms will be checked for security prior to opening doors.
	4. Floor Heat & Air Conditioning Master Switches - AS REQUIRED ***NOTE*** Heating and air conditioning as required for comfort.	a. Air Deflectors - EXTENDED (LM 2, 1) **WARNING** Primary loadmaster will visually or verbally ensure secondary loadmaster is clear of paratroop door prior to extending air deflectors. ***NOTE*** If air deflectors fail to extend electrically, manual extension may be accomplished.
		b. Jump Platforms - EXTENDED (LM 2, 1)
	5. Slowdown Checklist - "COMPLETED" (LM 1, E)	4. Slowdown Checklist - "COMPLETED" (LM 1, E)

19.68. Airdrop Personnel Checklist—*One-Minute Advisory.

NAVIGATOR	LOADMASTER
1. "CREW, ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 1)	1. "CREW, ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 1)
	2. Jumpmasters- ALERTED (LM 2, 1) ***NOTE*** Cleared exits will be turned over to jumpmaster as early as possible but, no later than one-minute advisory.

CAUTION

If an unsafe condition exists after the one-minute advisory, a no-drop will be called.

19.69. Airdrop Personnel Checklist—*CARP Checklist.

19.69.1. Navigator initiates CARP checklist by stating "TEN SECONDS," followed by "GREEN LIGHT" at release point. A countdown is optional. Scanner will position the jump signal light switch.

NAVIGATOR	ENGINEER	LOADMASTER
1. "TEN SECONDS" - (N)		1. "TEN SECONDS" - (N)
		2. Jumpmasters - ALERTED (LM 2, 1)
2. "GREEN LIGHT" - (N)	1. "GREEN LIGHT" - (N) Jump Signal Light Switch - ON (S)	3. "GREEN LIGHT" - (N)
		4. Status of Load - "ALL CLEAR" or "MALFUNCTION" (LM 1)
3. "RED LIGHT" - (N) ***NOTE*** State "RED LIGHT" at the end of usable DZ or loadmaster's call of "ALL CLEAR."	2. "RED LIGHT" - (N) Jump Signal Light switch - OFF (S)	5. "RED LIGHT" - (N) 6. Jumpmasters/Safety - WARNED (LM 2, 1) (on hearing or seeing red light)

19.70. Airdrop Personnel Checklist—*Post-Drop Checklist.

19.70.1. After completing airdrop, the pilot not flying the aircraft initiates post-drop checklist by stating "POST-DROP CHECKLIST." Initial escape will be at 160 KCAS until paratroop doors are closed. Loadmasters may initiate checklist on completing airdrop (red light). Comply with the following for personnel racetrack patterns: accomplish asterisk (*) items of the post-drop checklist, leave the flaps at the drop setting, and accomplish the checklists annotated with an asterisk, starting with the slowdown checklist.

PILOT	ENGINEER	LOADMASTER
*1. "POST-DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 1, E)	*1. "POST-DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 1, E)	*1. "POST-DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 1, E)
	*2. Floor Heat and Air Conditioning Master Switches - OFF	*2. Jump Platforms - AS REQUIRED (LM 2, 1) *3. Static Lines - RETRIEVED(LM 2, 1)
		*4. Air Deflectors - AS REQUIRED (LM 2, 1) **WARNING** Prior to retracting the air deflectors, primary loadmaster will visually or verbally ensure second loadmaster is clear of the paratroop door. ***NOTE*** If air deflectors fail to retract electrically, manual retraction may be accomplished.
	*3. Paratroop Doors - "AS REQUIRED" (LM 1)	*5. Paratroop Doors - "AS REQUIRED" (LM 1)
2. Flaps and Slats - "UP/RETRACTED" (CP)	4. Flaps and Slats - "UP/RETRACTED" (CP)	6. Parachute/Safety Harness - AS REQUIRED (LM 2, 1) 7. Jump Platform Lights-OFF (LM 1)
3. Paratroop Air Deflector Switch - "SAFE" (CP)	5. Paratroop Air Deflector Switch - "SAFE" (CP) 6. Jump Signal Caution Light Switch - "OFF" (S) 7. Landing Gear Warning Horn C/B - " CLOSED" (S)	*8. Static Line Retriever Cables - CHECKED/ SECURED (LM 2, 1) **WARNING** For multiple passes, re-rig retriever cables. If doors remain open, loadmaster will keep parachute or safety harness on with lifeline attached. Jumpmaster or safety will maintain control of door if duties require loadmaster to move out of position.
	*8. Floor Heat and Air Conditioning Master Switches - ON	9. Cargo Compartment Lights - AS REQUIRED (LM 1)
4. Pressurization - "AS REQUIRED" (P)	9. Pressurization - "AS REQUIRED" (P) Pressurize as directed by the pilot.	
	*10. Post-Drop Checklist - "COMPLETED" (LM 1, E)	*10. Post-Drop Checklist - "COMPLETED" (LM 1, E)

19.71. Amplified Heavy Equipment Checklist—Equipment Pre-Slowdown Checklist.

19.71.1. Complete this checklist prior to slowdown. The navigator will initiate the checklist. Coordination between pilot, navigator, and loadmaster will determine the time required to prepare the load for airdrop and the initiation of the pre-slowdown checklist.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "PRE-SLOWDOWN CHECK-LIST" (N), "HEAVY EQUIPMENT PROCEDURES" (P) "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "HEAVY EQUIPMENT PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECK-LIST" (N), "HEAVY EQUIPMENT PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "HEAVY EQUIPMENT PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)
		2. Floor Heat and Air Conditioning Master Switches - OFF 3. Jump Signal Caution Light Switch - "ON" (S) 4. Landing Gear Warning Horn C/B - "OPEN" (S)	2. Inspection of Load and Extraction System - COMPLETED (LM 3, 2) A visual inspection of each extraction system, to include the security of the recovery parachutes, will be accomplished.
2. Command Markers - "SET" (CP, P, E) 3. Aft Cargo Doors Switch - "ADS READY" (CP)		5. Command Markers - "SET" (CP, P, E) 6. Aft Cargo Doors Switch - "ADS READY" (CP)	3. Aft of load checked for obstructions - COMPLETED (LM 1) - Check aft of load for any obstructions and the troop ladder is in the up position.
			4. Bundle/Load Marker Lights - AS REQUIRED (LM 3, 2) (night drops only)
4. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	2. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	7. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	5. Emergency Aft Restraint Chains - CHECKED AS REQUIRED (LM 3, 2) - Ensure chains are properly positioned and readily available.
			6. Extraction Parachute Manual Control Handle Pin - REMOVED (LM 1)

Amplified Heavy Equipment Checklist—Equipment Pre-Slowdown Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			7. Lights - CHECKED/SET (LM 1) a. Jump signal light - RED b. Cargo compartment lights - AS REQUIRED Set interior lights to minimum acceptable intensity.
			8. Restraint Rails - CHECKED (LM 3, 2) - Ensure left-hand restraint rail mechanism master control shift lever is in SECURE position, right-hand control handles are in LOCKED position and all detents are locked into platforms.
		8. Depressurization - "COMPLETED" (E)	9. Outflow Valve - CHECKED (LM 3, 1) - Visually check outflow valve to ensure it is in the full open position.
			10. Ramp Manual Locking Pins - REMOVED/ STOWED (LM 3, 1)
			11. Pressure Door Side Seals - RETRACTED (LM 3, 1)
			12. "A" Valve Safety Guard - INSTALLED (LM 1)
			13. Door Lock Status Lights - CHECKED (LM 1) - Visually ensure door status NOT LKD lights are out and bypass switches are not activated.

Amplified Heavy Equipment Checklist—Equipment Pre-Slowdown Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			14. Pressure Door Upper Hinges - CHECKED (LM 3, 1) - Manually depress and release manual override "C" and "I" valves; visually check that upper hinges are selected and links are overcenter and against the stop, and the target assembly pin and release mechanism actuator are fully retracted.
5. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM 1)		9. Pressure Door - "CLEAR TO OPEN" (P) "OPEN" (LM 1) ***NOTE*** Air conditioning switch must be in "OFF" position for one minute prior to clearing the pressure door to open.	15. Pressure Door - "CLEAR TO OPEN" (P) "OPEN" (LM 1) a. Pressure door switch - UP and HOLD, then OFF
			WARNING Do not place pressure door switch to DOWN position once pressure door starts to move. To do so may cause pressure door to become unlocked from its upper hinge and fall. If pressure door movement has been interrupted, allow it to close under its own weight, then fully open without interruption. b. Monitor target assembly pin and release mechanism actuator during door movement c. Pressure door up light - ON
		10. Floor Heat and Air Conditioning Master Switches - AS REQUIRED ***NOTE*** Heating and air conditioning as required for comfort.	16. Extraction Line Guard - INSTALLED (LM 3) 17. Ramp Loading Lights - POSITIONED (LM 3, 1) - Lights will be positioned to a downward direction toward the center door.

Amplified Heavy Equipment Checklist—Equipment Pre-Slowdown Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			18. Parachute and Safety Harness - ON/FASTENED (LM 3, 2, 1) **WARNING** All personnel in cargo compartment will don parachute or safety harness, as applicable, and flotation gear, if required.
		11. Pre-Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)	19. Pre-Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.72. Heavy Equipment Checklist—Slowdown Checklist.

19.72.1. Initiate this checklist after flaps and slats have been extended to final airdrop setting during slowdown maneuver. Flaps will initially be set to 40 percent, then to final airdrop setting. The pilot not flying aircraft will initiate checklist by stating final flap and slat position indicator reading followed by "SLOWDOWN CHECKLIST."

PILOT	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)
2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) **CAUTION** Doors will not be cleared to open until airspeed is below 205 KCAS.	2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) a. Door control switch - Open and hold, then OFF. 3. Right-Hand Locks - RETRACTED (LM 3)- Unlock and release right-hand restraint rail mechanisms by placing appropriate control handles to UNLOCKED position. Visually ensure detents are retracted clear of inboard side of rail.
		4. Left-Hand Restraint Rail Master Control Shift Lever - AIRDROP (LM 2)
		5. Left-Hand Restraint Locks - ARMED (LM 2) - Operate master control handle in a pumping action until number 1 (2, 3, or 4 on multiple passes as appropriate) on rack is aligned with ARMED arrow on plate. Check to ensure marker arrows are aligned on each lock being used on that pass.
	3. Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)	6. Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.73. Heavy Equipment Checklist—One-Minute Advisory.

19.73.1. One minute prior to the drop time, the navigator announces "CREW, ONE-MINUTE ADVISORY."

NAVIGATOR	LOADMASTER
1. "CREW, ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 3, 2, 1)	1. "CREW, ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 3, 2, 1)
	2. Loadmasters - IN POSITION (LM 3, 2, 1) (LM 2) - Standby adjacent to left rail master control handle.

CAUTION:
If an unsafe conditions exists after the one-minute advisory, a no-drop will be called.

19.74. Heavy Equipment Checklist—CARP Checklist.

19.74.1. Navigator initiates the CARP checklist by stating, "TEN SECONDS," followed by "GREEN LIGHT" at the release point. A countdown sequence is optional. "GREEN LIGHT" must be seen or heard for the drop.

NAVIGATOR	ENGINEER	LOADMASTER
1. "TEN SECONDS" (N)	1. "TEN SECONDS" (N), ADS Chute Arming Switch - ARMED (S) Arm ADS chute as soon as navigator states "TEN SECONDS."	1. "TEN SECONDS" (N), ADS Chute ARM Light - CHECKED (LM 1) - Standby with hand adjacent to extraction parachute manual release control handle.
2. "GREEN LIGHT" (N)	2. "GREEN LIGHT" (N) - Jump Signal Light and ADS Chute Release Switches - ON and RELEASE (S) Simultaneously switch jump signal light and activate ADS chute release switch.	2. "GREEN LIGHT" (N): a. Extraction parachute manual control handle - RELEASE (LM 1) (if required) If extraction parachute is not visible or fails to release electrically, immediately pull manual release control handle to release position. Pull handle only after hearing or seeing GREEN LIGHT. b. Left hand restraint locks - RELEASED (LM 2) (if required). Actuate left hand lock release on single platforms (or last platform of a sequential) only after determining extraction parachute is fully deployed.
3. "RED LIGHT" (N) State "RED LIGHT" at end of usable DZ or loadmasters call of "ALL CLEAR".	3. "RED LIGHT" (N) - Jump Signal Light and ADS Chute Arming Switches - OFF and SAFE (S)	3. Status of Load - "ALL CLEAR" or "MALFUNCTION" (LM 1) 4. "RED LIGHT" (N)

19.75. Heavy Equipment Checklist—Post-Drop Checklist.

19.75.1. After completing airdrop, the pilot not flying the aircraft initiates the post drop checklist by stating, "POST-DROP CHECKLIST." Initial escape will be at 160 KCAS until the ramp and center door are closed. Loadmasters may initiate this checklist at "RED LIGHT" call. If multiple equipment drops are planned, all TOTs must be closely coordinated between the pilot, navigator, and loadmaster.

PILOT	ENGINEER	LOADMASTER
1. "POST-DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "POST-DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "POST-DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)
	2. Floor Heat and Air Conditioning Master Switches - OFF	
	3. Center Door and Ramp - "CLOSED" (LM 1)	2. Center Door and Ramp - "CLOSED" (LM 1) Position door control switch to CLOSE, then place to OFF.
2. Flaps and Slats - "AS REQUIRED" (CP) ***NOTE*** If additional passes are to be accomplished, flaps and slats may remain positioned or repositioned for the next drop.	4. Flaps and Slats - "AS REQUIRED" (CP) ***NOTE*** If additional passes are to be accomplished, flaps and slats may remain positioned or repositioned for next drop.	3. Parachute and Safety Harness - AS REQUIRED (LM 3, 2, 1) 4. Manual Parachute Release Handle - STOWED (LM 1) (if required) 5. Extraction Line Guard - REMOVED (LM 3) 6. Pressure Door Side Seals - CHECKED/RETRACTED (LM 3) Ensure pressure door side seals are retracted.
	5. Landing Gear Warning Horn C/B - "CLOSED" (S)	7. "A" Valve Safety Guard - INSTALLED (LM 1) 8. Pressure Door Upper Hinges - CHECKED (LM 3) 9. Target Pin and Release Actuator - FULLY RETRACTED (LM 3)
	6. Pressure Door - "CLOSED AND LOCKED" (LM 1)	10. Pressure Door - "CLOSED AND LOCKED" (LM 1) a. Pressure door switch - down and hold, then OFF (LM 1) b. Ramp locks and manual locking Pins - CHECKED/ INSTALLED (LM 1, 3) - Before installing locking pins, visually inspect the ramp locks to ensure that the upper shaft of the yoke is seated in the throat of the lock. c. Pressure door side seals - EXTENDED (LM 3, 1)

Heavy Equipment Checklist—Post-Drop Checklist

PILOT	ENGINEER	LOADMASTER
3. Aft Cargo Doors Switch - "SAFE" (CP)	7. Aft Cargo Doors Switch - "SAFE" (CP)	11. Left-Hand Restraint Locks - AS REQUIRED (LM 2)
	8. Jump Signal Caution Light Switch - "OFF"(S)	a. If additional passes are to be accomplished, complete the following: (1) Return shift lever to SECURE. (2) Operate master control handle until number 2 (3 or 4 if additional drops have been made) on the rack assembly is aligned with SAFE arrow. (3) Ensure all detents aft of the next platform to be airdropped have released clear of inboard side of rails. (4) Ensure master control handle is in locked position.
	9. Floor Heat and Air Conditioning Master Switches - ON	b. If no additional pass is to be accomplished, complete the following: (1) Operate master control handle until number 4 on rack assembly is aligned with RELEASE arrow **CAUTION** Do not reverse handle position in mid-travel. Do not reposition shift lever unless handle is in LOCKED position. Never force handle if binding occurs. (2) Ensure all locks have released clear of the inboard side of the rails. (3) Return shift lever to SECURE. (4) Operate the master control handle until number 1 on the rack assembly is aligned with the SAFE arrow. (5) Check that all locks have returned to the "SAFE" position. (6) Stow all sequence pins in storage holes in the reset levers. (7) Left hand locks - TENSION SET.
4. Pressurization - "AS REQUIRED" (P)	10. Pressurization - "AS REQUIRED" (P) Pressurize as directed by pilot	12. Right Hand Restraint Locks - AS REQUIRED (LM 3) a. Place control handles in LOCKED position. If additional passes are to be accomplished, leave control handles for locks aft of platforms to airdropped in UNLOCKED position. b. Ensure only appropriate locks are protruding through inboard side of rails and are in the overcenter (LOCKED) position.
	11. Post Drop Checklist - "COMPLETED" (LM 3, 2, 1, E)	13. Post Drop Checklist - "COMPLETED"(LM 3, 2, 1, E)

19.76. Heavy Equipment/Personnel (HEP) Combination Airdrop—Pre-Slowdown Checklist.

19.76.1. Complete this checklist prior to slowdown. Navigator will initiate checklist. Coordination among pilot, navigator, and loadmaster will determine time required to prepare load for airdrop and initiation of pre-slowdown checklist. Complete crew coordination is essential.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "PRE-SLOWDOWN CHECKLIST" (N), "HEP COMBO PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "HEP COMBO PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "HEP COMBO PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N) "HEP COMBO PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)
		2. Floor Heat and Air Conditioning Master Switches - OFF	2. Inspection of Load and Extraction System - COMPLETED (LM 3, 2,) - A visual inspection of each extraction system, to include the security of the recovery parachutes, will be accomplished.
			3. Aft of load checked for Obstructions - COMPLETED (LM 1) - Check aft of load for any obstructions and remove if found. Ensure troop ladder is up.
		3. Jump Signal Caution Light Switch - "ON" (S)	4. Bundle and Load Marker Lights - AS REQUIRED (LM 3, 2) (night drops only)
2. Paratroop Air Deflector Switch - "ARMED" (CP)		4. Landing Gear warning Horn C/B - "OPEN" (S) 5. Paratroop Air Deflector Switch - "ARMED" (CP)	5. Emergency Aft Restraint Chains - CHECKED (LM 3, 2) - Ensure chains are positioned properly and are readily available.
3. Aft Cargo Doors Switch - "ADS READY" (CP) 4. Command Markers - "SET" (CP, P, E)		6. Aft Cargo Doors Switch - "ADS READY" (CP) 7. Command Markers - "SET" (CP, P, E)	6. Extraction Parachute Manual Control Handle Pin - REMOVED (LM 1) 7. Lights - CHECKED (LM 2, 1) a. Jump signal - RED b. Cargo compartment - AS REQUIRED
5. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	2. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	8. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	8. Restraint Rails - CHECKED (LM 3, 2) Ensure left-hand restraint rail mechanism master control shift lever is in the SECURE position, right-hand control handles are in LOCKED position, and all detents are locked into platforms

HEP Combination Airdrop—Pre-Slowdown Checklist(continued)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		9. Depressurization - "COMPLETED" (E)	9. Outflow Valve - CHECKED (LM 3, 1) - Visually check outflow valve to ensure it is in full OPEN position.
			10. Ramp Manual Locking Pins - REMOVED and STOWED (LM 3, 1)
			11. Pressure Door Side Seals - RETRACTED (LM 3, 1)
			12. "A" Valve Safety Guard - INSTALLED (LM 1) 13. Door Lock Status Light - CHECKED
			14. Pressure Door Upper Hinges - CHECKED (LM 3, 1) - Manually depress and release manual override "C" and "I" valves; visually check that upper hinges are selected and links are overcenter and against the stop and the target assembly pin and release mechanism actuator are fully retracted.
6. Pressure Door - "CLEARED TO OPEN" (P), "OPEN" (LM 1)		10. Pressure Door - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	15. Pressure Door - "CLEAR TO OPEN" (P), "OPEN" (LM 1) a. Pressure door switch - UP and HOLD, then OFF
		NOTE Air conditioning switch must be in "OFF" position for one minute prior to clearing pressure door to open	**WARNING** Do not place pressure door switch to DOWN position once pressure door starts to move. To do so may cause the pressure door to become unlocked from its upper hinge and fall. If pressure door movement has been interrupted, allow it to close under its own weight, then fully open without interruption. b. Monitor target assembly pin and release mechanism actuator during door movement c. Pressure door up light - ON
		11. Floor Heat & Air Conditioning Master Switches - AS REQUIRED ***NOTE*** Heating and air conditioning as required for comfort.	16. Extraction Line Guard - INSTALLED (LM 3) 17. Ramp Loading Lights - POSITIONED (LM 3, 1) - Lights will be positioned to downward direction toward center door.

HEP Combination Airdrop—Pre-Slowdown Checklist(continued)

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			18. Parachute and Safety Harness - ON/FASTENED (LM 3, 2, 1) **WARNING** All personnel in cargo compartment will don a parachute and safety harness as applicable (and flotation gear if required).
		12 . Pre-Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)	19. Pre-Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.77. HEP Combination Airdrop—Slowdown Checklist.

19.77.1. This checklist will be initiated after flaps and slats have been extended to final airdrop setting during slowdown maneuver. Flaps will initially be set to 40 percent, then to final airdrop setting. Pilot not flying aircraft will initiate checklist by stating final flap and slat position indicator reading followed by "SLOWDOWN CHECKLIST."

PILOT	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)
		2. Jumpmasters - ALERTED (LM 3, 1)
2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) **CAUTION** Doors will not be cleared to open until airspeed is below 205 KCAS.	2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	3. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) -door control switch - OPEN and HOLD, then OFF. 4. Right-Hand Locks - RETRACTED (LM 3) - Unlock and release right-hand restraint rail mechanisms by placing appropriate control handles to UNLOCKED position. Visually ensure detents are retracted clear of inboard side of rail.
		5. Left-Hand Restraint Rail Master Control Shift Lever - AIRDROP (LM 2)
		6. Left-Hand Restraint Locks - ARMED (LM 2) - Operate master control handle in pumping action until number 1 (2, 3, or 4 on multiple passes, as appropriate) on rack is aligned with ARMED arrow on plate. Check to ensure marker arrows are aligned on each lock being used on that pass.
	3. Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)	7. Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.78. HEP Combination Airdrop—One-Minute Advisory.

19.78.1. One minute prior to drop time, navigator announces "CREW, ONE-MINUTE ADVISORY." Advisory will be given on time.

NAVIGATOR	LOADMASTER
1. "CREW, ONE-MINUTE ADVISORY" (N) "ACKNOWLEDGED" (LM 3, 2, 1)	1. "CREW, ONE MINUTE ADVISORY" (N) "ACKNOWLEDGED" (LM 3, 2, 1)
	2. Loadmasters - IN POSITION (LM 3, 2, 1), (LM 2) standby adjacent to left rail master control handle.

CAUTION

If an unsafe condition exists after the one-minute advisory, a no-drop will be called.

19.79. HEP Combination Airdrop—CARP Checklist.

19.79.1. Navigator initiates CARP checklist by stating "TEN SECONDS," followed by "GREEN LIGHT" at release point. A countdown is optional. Scanner will position jump signal light switch as commanded. "GREEN LIGHT" must be seen or heard for the drop.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "TEN SECONDS" (N)	1. "TEN SECONDS" (N), ADS Chute Arming Switch - ARMED (S) Arm the ADS chute as soon as the navigator states "TEN SECONDS."	1. "TEN SECONDS" (N), Chute ARM Light - ON - Standby with hand adjacent to the extraction parachute manual release control handle.
	2. "GREEN LIGHT" (N)	2. "GREEN LIGHT" (N), Jump Signal Light and ADS Chute Release Switches - ON/RELEASE (S) Simultaneously switch jump signal jump light on and activate the ADS chute release switch.	2. "GREEN LIGHT" (N) - a. Extraction parachute manual control handle - RELEASE (LM 1) (if required). If extraction parachute is not visible or fails to release electrically, immediately pull manual release control handle to release position. Pull handle only after hearing or seeing GREEN LIGHT.

HEP Combination Airdrop—CARP Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			b. Left-hand restraint locks - RELEASED (LM 2) (if required). Actuate left-hand lock release on single platforms (or last platform of a sequential) only after determining extraction parachute is fully deployed. 3. Status of Load - "ALL CLEAR" or "MALFUNCTION" (LM 1)
	3. "RED LIGHT" - (N)	3. "RED LIGHT" (N) - Jump Signal Light and ADS Chute Arming Switches - OFF and SAFE (S)	4. "RED LIGHT" - (N)
		4. Center Door and Ramp - "CLOSED" (LM 1)	5. Center Door and Ramp - "CLOSED" (LM 1)
1. Command Markers - "RESET" (CP, P, E)		5. Command Markers - "RESET" (CP, P, E)	
		6. Loadmasters - "IN POSITION" (LM 1)	6. Loadmasters - "IN POSITION" (LM 1) ***NOTE*** Coordinate with jumpmaster to ensure all commands are completed and all load masters are in position to configure paratroop doors.
2. Flaps and Slats - "80 PERCENT/ EXTENDED" (CP)		7. Flaps and Slats - "80 PERCENT/EXTENDED" (CP) 8. Floor Heat and Air Conditioning Master Switches - OFF	
3. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)		9. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	7. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) ***NOTE*** Check jump platform for security prior to opening paratroop door. Paratroop door will not be opened until cleared by the pilot. Ensure static lines are attached to anchor cables before doors are opened.

HEP Combination Airdrop—CARP Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			a. Air Deflectors - EXTENDED (LM 3, 1) **WARNING** Primary loadmaster will visually or verbally ensure secondary loadmaster is clear of paratroop door prior to extending air deflectors. ***NOTE*** If air deflectors fail to extend electrically, manual extension may be accomplished.
			b. Jump Platforms - EXTENDED (LM 3, 1)
		10. Reconfiguration for Personnel Airdrop - "COMPLETED" (LM 1)	8. Reconfiguration for Personnel Airdrop - "COMPLETED" (LM 3, 1)
	4. "PERSONNEL AIRDROP ONE- MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 1)		9. "PERSONNEL AIRDROP ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 1)
	5. "TEN SECONDS" (N)		10 Jumpmasters - ALERTED (LM 3, 1) 11. "TEN SECONDS" (N)
	6. "GREEN LIGHT" (N)	11. "GREEN LIGHT" (N), Jump Signal Light Switch - ON (S)	12. "GREEN LIGHT" (N)
			13. Status of Load - "ALL CLEAR" or "MALFUNCTION" (LM 1)
	7. "RED LIGHT" (N)	12. "RED LIGHT" (N), Jump Signal Light Switch - OFF (S)	14. "RED LIGHT" - (N), RED LIGHT Checked (LM 2, 1), a. Jumpmaster and Safety - WARNED
NOTE If personnel racetracks are to be accomplished, return to CARP checklist, step 2.	***NOTE*** If personnel racetracks are to be accomplished, return to CARP checklist, step 4.	***NOTE*** If personnel racetracks are to be accomplished, complete the following steps.	***NOTE*** If personnel racetracks are to be accomplished, complete the following steps. 15. Jump Platforms - AS REQUIRED (LM 3, 1) 16. Static Lines - RETRIEVED (LM 3, 1) 17. Air Deflectors - AS REQUIRED (LM 3, 1)

		13. Paratroop Doors - "AS REQUIRED" (LM 1) ***NOTE*** Return to CARP checklist step 7.	18. Paratroop Doors - "AS REQUIRED" (LM 1) 19. Static Line Retriever Cables - SECURED ***NOTE*** Return to CARP checklist step 7.

19.80. HEP Combination Airdrop—Post-Drop Checklist.

19.80.1. After completing airdrop, the pilot not flying the aircraft initiates the post drop checklist by stating, "POST-DROP CHECKLIST." Initial escape will be at 160 KCAS until the ramp and center door are closed. Loadmasters may initiate this checklist at "RED LIGHT" call.

PILOT	ENGINEER	LOADMASTER
1. "POST-DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "POST-DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "POST-DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM 3, 2, 1, E)
	2. Floor Heat and Air Conditioning Master Switches - OFF	2. Jump Platforms - RETRACTED (LM 3, 1)
		3. Static Lines - RETRIEVED (LM 3, 1)
		4. Air Deflectors - RETRACTED (LM 3, 1) ***NOTE*** If air deflectors fail to retract electrically, manual retraction may be accomplished.
	3. Paratroop Doors - "CLOSED" (LM 1)	5. Paratroop Doors - "CLOSED" (LM 1)
2. Flaps and Slats - "UP AND RETRACTED" (CP)	4. Flaps and Slats - "UP AND RETRACTED" (CP)	6. Parachute and Safety Harness - AS REQUIRED (LM 3, 2, 1) 7. Jump Platform Lights - OFF (LM 3, 1)
	5. Landing Gear Warning Horn C/B "CLOSED" (S)	8. Extraction Line Guard - REMOVED (LM 3)
		9. Pressure Door Side Seals - CHECKED/RETRACTED (LM 3) - Ensure pressure door side seals are retracted. 10. "A" Valve Safety Guard - INSTALLED (LM 1) 11. Pressure Door Upper Hinges - CHECKED (LM 3) 12. Target Pin and Release Actuator - FULLY RETRACTED (LM 3)

HEP Combination Airdrop—Post-Drop Checklist (continued).

PILOT	ENGINEER	LOADMASTER
	6. Pressure Door - “CLOSED AND LOCKED” (LM 1)	13. Pressure Door-"CLOSED AND LOCKED" (LM 1) a. Pressure door switch - down and hold, then OFF (LM 1)
3. Aft Cargo Doors Switch - "SAFE" (CP)	7. Aft Cargo Door Switch - “SAFE” (CP)	b. Ramp locks and manual locking Pins - CHECKED/ INSTALLED (LM 1, 3) - Before installing locking pins, visually inspect the ramp locks to ensure that the upper shaft of the yoke is seated in the throat of the lock.
4. Paratroop Air Deflector Switch - “SAFE (CP)	8. Paratroop Air Deflector Switch - “SAFE” (CP)	c. Pressure door side seals-EXTENDED (LM 3, 1)
	9. Jump Signal Caution Light Switch - "OFF" (S)	14. Left-Hand Restraint Locks - AS REQUIRED (LM 2) a. If additional passes are to be accomplished, complete the following (1) Return shift lever to SECURE (2) Operate master control handle until number 2 (3 or 4 if additional drops have been made) on rack assembly until aligned with SAFE arrow (3) Ensure all detents aft of next platform to be airdropped have released clear of inboard side of rails (4) Ensure master control handle is in LOCKED position b. If no additional pass is to be accomplished, complete the following: (1) Operate master control handle until number 4 on rack assembly is aligned with RELEASE arrow **CAUTION** Do not reverse handle position in mid-travel. Do not reposition shift lever unless handle is in LOCKED position. Never force handle if binding occurs. (2) Ensure all locks have released clear of the inboard side of the rails. (3) Return shift lever to SECURE. (4) Operate the master control handle until number 1 on the rack assembly is aligned with the SAFE arrow. (5) Check that all locks have returned to the "SAFE" position. (6) Stow all sequence pins in storage holes in the reset levers. (7) Left hand locks - TENSION SET.
	10. Floor Heat and Air Conditioning Master Switches - ON	
5. Pressurization - "AS REQUIRED" (P)	11. Pressurization - "AS REQUIRED" (P) Pressurize as directed by pilot.	15. Right Hand Restraint Locks - AS REQUIRED (LM 3): a. Place control handles in LOCKED position. If additional passes are to be accomplished, leave control handles for locks aft of platforms to airdropped in UNLOCKED position. b. Ensure that only appropriate locks are protruding through inboard side of rails and are in overcenter (LOCKED) position.
	12. Post-Drop Checklist - "COMPLETED" (LM 3, 2, 1, E)	16. Post-Drop Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.81. Heavy Equipment Using A/A37A-11 Towplate—Pre-Slowdown Checklist.

19.81.1. Complete this checklist prior to slowdown. Navigator will initiate checklist by stating "PRE-SLOWDOWN CHECKLIST." Coordination among pilot, navigator, and loadmaster will determine time required to prepare load for airdrop and initiation time of pre-slowdown checklist by navigator.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "PRE-SLOWDOWN CHECKLIST"(N), "TOWPLATE PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "TOWPLATE PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST"(N), "TOWPLATE PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST"(N), "TOWPLATE PROCEDURES" (P), "ACKNOWLEDGED" (LM 3, 2, 1, E)
		2. Floor Heat and Air Conditioning Master Switches - OFF 3. Landing Gear Warning Horn C/B - "OPEN" (S)	2. Inspection of Load and Extraction System - COMPLETED (LM 3, 2) a. Visually inspect each extraction system, to include the security of the recovery parachutes. b. Check extraction link/latch to ensure properly set. c. Ensure jettison link is secure.
			3. Aft of load checked for Obstructions - COMPLETED (LM 1) - Check aft of load for any obstructions and troop ladder is in UP position.
2. Command Markers - "SET" (CP, P, E)		4. Command Markers - "SET" (CP, P, E)	4. Bundle/Load Marker Lights - AS REQUIRED (LM 3, 2) (night drops only)
3. Aft Cargo Doors Switch - "ADS READY" (CP)		5. Aft Cargo Doors Switch - "ADS READY" (CP)	5. Extraction Parachute Manual Control Handle Pin - REMOVED (LM 1) 6. Cargo Compartment Lights - AS REQUIRED (LM 1) - Set interior lights to minimum acceptable intensity.
4. Slowdown, Drop Zone, and Escape - "REVIEWED"(CP, P, N)	2. Slowdown, Drop Zone, and Escape - "REVIEWED"(CP, P, N)	6. Slowdown, Drop Zone, and Escape - "REVIEWED"(CP, P, N)	7. Restraint Rails - CHECKED (LM 3, 2) - Ensure left-hand restraint rail mechanism master control shift lever is in SECURE position, right-hand control handles are in LOCKED position, and all detents are locked into platforms.
			8. Emergency Aft Restraint Chains - CHECKED (LM 3, 2) - Ensure chains are positioned properly and readily available
		7. Depressurization - "COMPLETED" (E)	9. Outflow Valve - CHECKED (LM 1) - Visually check outflow valve to ensure it is in the full open position.

Heavy Equipment Using A/A37A-11 Towplate—Pre-Slowdown Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
			10. Ramp Manual Locking Pins - REMOVED AND STOWED (LM 3, 1)
			11. Pressure Door Side Seals - RETRACTED (LM 3, 1)
			12. "A" Valve Safety Guard - INSTALLED (LM 1)
			13. Door Lock Status Lights - CHECKED (LM 1) - Visually ensure door status NOT LKD lights are out and bypass switch is not activated.
			14. Pressure Door Upper Hinges - CHECKED (LM 3, 1) - Manually depress and release manual over-ride "C" & "I" valves, visually check that upper hinges are selected and links are over-center and against stop, and target assembly pin and release mechanism actuator are fully retracted.
5. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM 1)		8. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM 1) ***NOTE*** Air conditioning switch must be in "OFF" position for one minute prior to clearing pressure door to open.	15. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM 1) a. Pressure Door Switch - up and hold, then OFF. **WARNING** Do not place pressure door switch to DOWN position once pressure door starts to move. To do so may cause pressure door to become unlocked from its upper hinge and fall. If pressure door movement has been interrupted, allow it to close under its own weight, then fully open without interruption. b. Monitor target assembly pin and release mechanism actuator during door movement. c. Pressure Door Up Light - On

Heavy Equipment Using A/A37A-11 Towplate—Pre-Slowdown Checklist (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		9. Floor Heat & Air Conditioning Master Switches - AS REQUIRED ***NOTE*** Heating and air conditioning as required for comfort.	16. Extraction Line Guard - INSTALLED (LM 3) 17. Ramp Loading Lights - POSITIONED (LM 3, 1) - Lights will be positioned to downward direction toward center door.
			18. Tow-Plate Control Unit - CHECKED (LM 3, 1) a. Electrical Connector - CONNECTED TO AIRCRAFT. b. Handle - NEUTRAL c. Safety Pin - INSTALLED d. Safety Light - ON
			19. Parachute/Safety Harness - ON/ FASTENED (LM 3, 2, 1)
			WARNING All personnel in cargo compartment will don a parachute/safety harness as applicable (and flotation gear, if required).
		10. Pre-Slowdown Checklist- "COMPLETED" (LM 3, 2, 1, E)	20. Pre-Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.82. Towplate Procedures Checklist—Slowdown Checklist.

19.82.1. This checklist will be initiated after flaps and slats have been extended to final airdrop setting during slowdown maneuver. Flaps will initially be set to 40 percent, then to final airdrop setting. Pilot not flying aircraft will initiate checklist by stating final flap and slat position indicator reading followed by "SLOWDOWN CHECKLIST."

PILOT	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)
2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) **CAUTION** Doors will not be cleared to open until airspeed is below 205 KCAS.	2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) a. Door Control Switch - OPEN and HOLD, then OFF. 3. Towplate Control Unit Safety Light - CHECKED/ON (LM 3) - A no-drop condition exists if light is not illuminated after troubleshooting. ***NOTE*** If safety light is not on, proceed with the following: a. Press to test light b. Check line plug for security in receptacle and electrical
		connector at control unit. c. Check C/B on control unit. d. Check cargo service outlet DC C/B (main DC bus 1). ***NOTE*** If light condition is corrected without closing doors, continue with slowdown checklist in order. **WARNING** Doors must be closed before continuing with troubleshooting towplate. e. Check electrical connectors at towplate and microswitch against latch or link. ***NOTE*** If light condition is corrected after doors are closed, continue with slowdown checklist from item 2.
		4. Right-Hand Locks - RETRACTED (LM 1) - Unlock and release right-hand restraint rail mechanisms by placing appropriate control handles to UNLOCKED position. Visually ensure detents are retracted clear of inboard side of rail. Return to parachute manual release handle.
		5. Left-Hand Restraint Rail Master Control Shift Lever - AIRDROP (LM 2)
		6. Left-hand Restraint Locks - ARMED (LM 2) - Operate master control handle in pumping action until number 1 (2, 3, or 4 on multiple passes, as appropriate) on rack is aligned with ARMED arrow on plate. Check to ensure marker arrows are aligned on each lock being used on that pass.
	3. Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)	7. Slowdown Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.83. Towplate Procedures Checklist—One-Minute Advisory.

19.83.1. One minute prior to drop time, navigator announces "CREW, ONE-MINUTE ADVISORY."

NAVIGATOR	LOADMASTER
1. "CREW, ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 3, 2, 1)	1. "CREW, ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 3, 2, 1)
	2. Loadmasters - IN POSITION (LM 3, 2, 1)
	3. Towplate Control Unit Safety Light - CHECKED/ON (LM 3) - Ensure safety light is illuminated. **WARNING** A no-drop condition exists if safety light is not illuminated.
	4. Towplate Control Unit Handle Safety Pin - REMOVED (LM 3)

CAUTION
If an unsafe condition exists after the one-minute advisory, a no-drop will be called.

19.84. Towplate Procedures Checklist—Drogue Chute Deployment.

19.84.1. Twenty seconds prior to the CARP the navigator will initiate the drogue chute deployment checklist by stating "TWENTY SECONDS."

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "TWENTY SECONDS" (N)	1. "TWENTY SECONDS" (N) ADS Chute Arming Switch - ARMED (S) Activate ADS Arming switch to chute - ARMED when navigator calls "TWENTY SECONDS."	1. "TWENTY SECONDS" (N)
1. "DEPLOY DROGUE" (P) - Pilot will state "DEPLOY DROGUE" at navigator's "TWENTY SECONDS" or as required depending on approach and other conditions. If no-drop is called prior to green light, pilot will state "JETTISON DROGUE."		2. "DEPLOY DROGUE" (P), Jump Signal Caution Light Switch - ON, ADS Chute Release Switch - RELEASE (S) - Simultaneously turn jump signal caution light switch on and activate ADS chute release switch.	2. "DEPLOY DROGUE" (P) - Extraction Parachute Manual Control Handle - RELEASE (LM 1) (if required) - If drogue chute is not visible or fails to release electrically, immediately pull manual release control handle to release position. Pull handle only after hearing "DEPLOY DROGUE" or seeing red light.
		3. Drogue Status - "DROGUE OK" or "DROGUE MALFUNCTION" (LM 3)	3. Drogue Status - "DROGUE OK" or "DROGUE MALFUNCTION" (LM 3) - If drogue chute malfunctions prior to "GREEN LIGHT," immediately accomplish drogue malfunction checklist. ***NOTE*** If control unit safety light goes out after deployment, continue drop if drogue chute remains inflated.

19.85. Towplate Procedures Checklist—CARP Checklist.

19.85.1. Navigator initiates the CARP checklist by stating "TEN SECONDS," followed by "GREEN LIGHT" at release point. Countdown sequence is optional. "GREEN LIGHT" must be seen or heard for drop.

NAVIGATOR	ENGINEER	LOADMASTER
1. "TEN SECONDS" (N)	1. TEN SECONDS" (N)	1. TEN SECONDS" (N)
2. "GREEN LIGHT" (N)	2. "GREEN LIGHT" (N) - Jump Signal Light Switch - ON (S)	2. "GREEN LIGHT" (N) a. Towplate control unit handle - PULLED (LM 3) b. Towplate control unit handle - PUSHED (LM 3) **CAUTION** Momentarily pause to allow transfer prior to pushing control unit handle forward.
		3. Status of Load - "ALL CLEAR" or "MALFUNCTION" (LM 3) **WARNING** In event of simultaneous negative transfer and negative drogue jettison, LM 3 will state "NEGATIVE TRANSFER, NEGATIVE JETTISON" and complete equipment malfunction checklist.
		4. Left-Hand Restraint Locks - RELEASED (LM 2) (if required) - Actuate left-hand lock release on single platforms (or last platform of sequential) only after determining extraction parachute is fully deployed.
3. "RED LIGHT" (N) - State "RED LIGHT" at end of usable DZ or loadmasters call of "ALL CLEAR."	3. "RED LIGHT" (N) - Jump Signal Light and ADS Chute Arming Switches - OFF and SAFE (S)	5. "RED LIGHT" (N)

19.86. Towplate Procedures Checklist—Post-Drop Checklist.

19.86.1. After completion of airdrop, pilot not flying aircraft initiates post-drop checklist by stating "POST DROP CHECKLIST." Initial escape will be at 160 KCAS until the ramp and center door are closed. Loadmasters may initiate this checklist at "RED LIGHT" call.

PILOT	ENGINEER	LOADMASTER
1. "POST DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "POST DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)	1. "POST DROP CHECKLIST" (CP), "ACKNOWLEDGED" (LM 3, 2, 1, E)
	2. Floor Heat and Air Conditioning Master Switches - OFF	2. Towplate Control Unit - SET (LM 3) Return control handle to neutral position and install safety pin.

Towplate Procedures Checklist—Post-Drop Checklist. (continued).

PILOT	ENGINEER	LOADMASTER
	3. Center Door and Ramp - "CLOSED" (LM 1)	3. Center Door and Ramp - "CLOSED" (LM 1) a. Position door control switch to CLOSE, then place to OFF. 4. Parachute/Safety Harness - AS REQUIRED
2. Flaps and Slats - "AS REQUIRED" (CP) ***NOTE*** If additional passes are to be accomplished, flaps and slats may remain positioned or repositioned for next drop.	4. Flaps and Slats - "AS REQUIRED" (CP) ***NOTE*** If additional passes are to be accomplished, flaps and slats may remain positioned or repositioned for next drop.	5. Manual Parachute Release Handle - STOWED (LM 1) 6. Extraction Line Guard - REMOVED (LM 3) 7. Pressure Door Side Seals - CHECKED/RETRACTED (LM 3, 1) - Ensure pressure door side seals are retracted. 8."A" Valve Safety Guard-INSTALLED (LM 1) 9. Pressure Door Upper Hinges - CHECKED (LM 3, 1) - Visually check that pressure door upper hinges are selected and links are overcenter and against stop. 10. Target Pin and Release Actuator - FULLY RETRACTED (LM 3)
	5. Pressure Door - "CLOSED AND LOCKED" (LM 1)	11. Pressure Door - "CLOSED AND LOCKED" (LM 1) a. Pressure door switch - DOWN and HOLD, then OFF. b. Ramp locks and manual locking pins - CHECKED and INSTALLED (LM 3, 1) - Before installing locking pins, visually inspect ramp locks to ensure that upper shaft of yoke is seated in throat of lock. c. Pressure door side seals - EXTENDED (LM 3, 1)
		12. Left Hand Restraint Locks - AS REQUIRED (LM 2) a. If additional passes are to be accomplished, complete the following : (1) Return shift lever to SECURE (2) Operate master control handle until number 2 (3 or 4 if additional drops have been made) on rack assembly is aligned with SAFE arrow. (3) Ensure all detents aft of next platform to be airdropped have released clear of inboard side of rails. (4) Ensure master control handle is in LOCKED position.

Towplate Procedures Checklist—Post-Drop Checklist. (continued).

PILOT	ENGINEER	LOADMASTER
3. Aft Cargo Doors Switch - "SAFE" (CP)	6. Aft Cargo Doors Switch - "SAFE" (CP) 7. Jump Signal Caution Light Switch - "OFF" (S) 8. Landing Gear Warning Horn C/B- "CLOSED" (S) 9. Floor Heat and Air Conditioning Master Switch - ON	b. If no additional passes are to be accomplished, complete the following: (1) Operate master control handle until number 4 on lock assembly is aligned with RELEASE arrow. **CAUTION** Do not reverse handle position in mid-travel. Do not reposition shift lever unless handle is in LOCKED position. Never force handle if binding occurs. (2) Ensure all locks have released clear of the inboard side of the rails. (3) Return shift lever to SECURE. (4) Operate master control handle until number 1 on rack assembly is aligned with SAFE arrow. (5) Check that all locks have returned to the safe position. (6) Stow all sequence pins in storage holes in reset levers. (7) Left hand locks - TENSION SET.
4. Pressurization - "AS REQUIRED" (P)	10. Pressurization - "AS REQUIRED" (P) - Pressurize as directed by pilot.	13. Right Hand Restraint Locks - AS REQUIRED (LM 3)
		a. Place control handles in LOCKED position. If additional passes are to be accomplished, leave control handles for locks aft of platforms to be airdropped in UNLOCKED position. b. Ensure only appropriate locks are protruding through inboard side of rails and are in overcenter (LOCKED) position.
	11. Post Drop Checklist - "COMPLETED" (LM 3, 2, 1, E)	14. Post Drop Checklist - "COMPLETED" (LM 3, 2, 1, E)

19.87. HALO/HAHO Airdrop Checklist.

19.87.1. This checklist prepares crew and aircraft for high altitude operations. It will be called for prior to **all** high altitude drops before the initiation of the applicable pre-slowdown checklist. Navigator initiates this checklist by stating "HALO AND HAHO AIRDROP CHECKLIST." Complete this checklist prior to reaching a cabin altitude of 10,000-feet.

***NOTES*:**

The copilot announces and the engineer and loadmaster acknowledge each 5,000 foot change in cabin pressure (10,000, 15,000, 20,000 etc.). Engineer monitors cabin altitude and advises copilot if altitude calls are not made. The loadmaster will advise the jumpmaster of each 5,000 foot change. Accomplish this checklist every 30 minutes above 20,000-feet and every 5 minutes above 30,000-feet.

Troops will be moved to the cargo compartment in sufficient time to prepare for HALO/HAHO AIRDROP CHECKLIST.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
1. "HALO/HAHO AIRDROP CHECKLIST" (N), "RAMP EXIT PROCEDURE" or "PARATROOP DOOR EXIT PROCEDURE" (P), "ACKNOWLEDGED" (CP, LM 2, LM 1, S, E)	1. "HALO/HAHO AIRDROP CHECKLIST" (N), "RAMP EXIT PROCEDURE" or "PARATROOP DOOR EXIT PROCEDURE" (P), “ACKNOWLEDGED" (CP, LM 2, LM 1, S, E)	1. "HALO/HAHO AIRDROP CHECKLIST" (N), "RAMP EXIT PROCEDURE" or "PARATROOP DOOR EXIT PROCEDURE" (P), "ACKNOWLEDGED" (CP, LM 2, LM 1, S, E)	1. "HALO/HAHO AIRDROP CHECKLIST" (N), "RAMP EXIT PROCEDURE" or "PARATROOP DOOR EXIT PROCEDURE" (P), "ACKNOWLEDGED" (CP, LM 2, LM 1, S, E)
2. Oxygen Mask - "ON, 100 PERCENT" (CP, P, N, S, LM 2, LM 1, E) a. Mask and Hose Connections - CHECKED b. Regulator Flow Indicator - CHECKED 3. Warning Horn - SILENCED (when activated) (CP)	2. Oxygen Mask - "ON, 100 PERCENT" (CP, P, N, LM2, LM1, S, E) a. Mask and Hose Connections - CHECKED b. Regulator Flow Indicator - CHECKED	2. Oxygen Mask - "ON, 100 PERCENT" (CP, P, N, LM 2, LM 1, S, E) a. Oxygen Quantity - CHECKED b. Mask and Hose Connections - CHECKED c. Regulator Flow Indicator - CHECKED 3. HALO/HAHO Airdrop Checklist - "COMPLETED" (E)	2. Oxygen Mask - "ON, 100 PERCENT" (CP, P, N, LM 2, LM 1, S, E) a. Oxygen Quantity - CHECKED b. Mask and Hose Connections - CHECKED c. Regulator Flow Indicator - CHECKED d. Loadmaster will ensure all personnel in the cargo compartment have oxygen immediately available if drop altitude is above 10,000-feet. 3. Cargo Compartment Lights - AS REQUIRED (LM 1) 4. Jump Platform Lights - ON (LM 2, 1) (if required)

19.88. HALO/HAHO Airdrop Checklist—Pre-Slowdown Checklist.

19.88.1. Complete this checklist prior to slowdown. Navigator will initiate checklist by stating "PRE-SLOWDOWN CHECKLIST." Coordination among pilot, navigator, and loadmaster will determine time required to prepare load for airdrop and initiation time of pre-slowdown checklist by navigator.

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
	1. "PRE-SLOWDOWN CHECKLIST" (N), "ACKNOWLEDGED" (LM 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "ACKNOWLEDGED" (LM 2, 1, E)	1. "PRE-SLOWDOWN CHECKLIST" (N), "ACKNOWLEDGED" (LM 2, 1, E)
		2. Floor Heat and Air Conditioning Master Switches - OFF (Ramp Exit)	2. Jumpmasters - ADVISED (LM 2, 1)
1. Command Markers - "SET" (CP, P, E)		3. Command Markers - "SET" (CP, P, E)	
2. Aft Cargo Door Switch - "AS REQUIRED" (CP)		4. Aft Cargo Doors Switch - "ADS READY" (CP) (Ramp Exit Only)	
3. Paratroop Air Deflector Switch - "AS REQUIRED "(CP) (paratroop door exit only)		5. Paratroop Air Deflector Switch - "ARM" (CP) (Paratroop Door Exit Only)	
		6. Jump Signal Caution Light Switch - "ON" (S)	3. Jump Signal Caution Light Switch - RED (LM 2, 1)
		7. Landing Gear Warning Horn C/B - "OPEN" (S)	4. Bundle/Load Marker Lights - AS REQUIRED (LM 2, 1) (night drops only)
4. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	2. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	8. Oxygen Quantity - "CHECKED" (LM 2, 1, E) 9. Slowdown, Drop Zone, and Escape - "REVIEWED" (CP, P, N)	5. Oxygen Quantity - "CHECKED" (LM 2, 1) - All loadmasters will check oxygen quantity in walk-around bottles to ensure adequate amount is available and report to primary loadmaster.
		10. Depressurization - “COMPLETED" (E)	6. Outflow Valve - CHECKED (LM 1) - Visually check outflow valve to ensure it is in the full open position.

19.88. HALO/HAHO Airdrop Checklist—Pre-Slowdown Checklist. (continued).

PILOT	NAVIGATOR	ENGINEER	LOADMASTER
		FOR PARATROOP DOOR EXIT 11. Pre-Slowdown Checklist -"COMPETED" (LM 2, 1, E)	**FOR PARATROOP DOOR EXIT** 7. Pre-Slowdown Checklist - "COMPLETED" (LM 2, 1, E)
FOR RAMP EXIT		**FOR RAMP EXIT**	**FOR RAMP EXIT**
			8. Ramp Manual Locking Pins - REMOVED AND STOWED (LM 2, 1)
			9. Pressure Door Side Seals - RETRACTED (LM 2, 1)
			10. "A" Valve Safety Guard-INSTALLED (LM1)
			11. Door Lock Status Lights - CHECKED (LM 1) - Visually ensure door status NOT LKD lights are out and bypass switches are not activated. 12. Pressure Door Upper Hinges - CHECKED (LM 2, 1) - Manually depress and release manual over-ride "C" & "I" valves, visually check that upper hinges are selected and links are over-center and against stop, and target assembly pin and release mechanism actuator are fully retracted.
5. Pressure Door - "CLEARED TO OPEN" (P), "OPEN" (LM 1)		12. Pressure Door - "CLEARED TO OPEN" (P), "OPEN" (LM 1) ***NOTE*** Air conditioning switch must be in "OFF" position for one minute prior to clearing pressure door to open.	13. Pressure Door - "CLEARED TO OPEN" (P) "OPEN" (LM 1) a. Pressure Door Switch - up and hold, then OFF. **WARNING** Do not place pressure door switch to DOWN position once pressure door starts to move. To do so may cause pressure door to become unlocked from its upper hinge and fall. If pressure door movement has been interrupted, allow it to close under its own weight, then fully open without interruption.
		13. Floor Heat and Air Conditioning Master Switches - AS REQUIRED - Floor heat and air conditioning as required for comfort	b. Monitor target assembly pin and release mechanism actuator during door movement. c. Pressure door up light - ON
			14. Parachute/Safety Harness - ON/FASTENED
		14. Pre-Slowdown Checklist - "COMPLETED" (LM 2, 1, E)	15. Pre-Slowdown Checklist - "COMPLETED" (LM 2, 1, E)

19.89. HALO/HAHO Airdrop Checklist—*Slowdown Checklist.

19.89.1. Initiate this checklist after flaps and slats have been extended to final airdrop setting during slowdown maneuver. Flaps will initially be set to 40 percent, then to final airdrop setting. The pilot not flying aircraft will initiate checklist by stating final flap and slat position indicator reading followed by "SLOWDOWN CHECKLIST."

PILOT	ENGINEER	LOADMASTER
1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 2, 1, E)	1. "SLOWDOWN CHECKLIST" (CP), "ACKNOWLEDGED" (LM 2, 1, E) 2. Jumpmasters/Safety - ALERTED (LM 2, 1)
FOR RAMP EXIT	**FOR RAMP EXIT**	**FOR RAMP EXIT**
2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) **CAUTION** Doors will not be cleared to open until airspeed is below 205 KCAS.	2. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) **CAUTION** Doors will not be cleared to open until airspeed is below 205 KCAS.	3. Aft Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) - door control switch - OPEN and HOLD, then OFF.
	3. Slowdown Checklist - "COMPLETED" (LM 2, 1, E)	4. Slowdown Checklist - "COMPLETED" (LM 2, 1, E)
FOR PARATROOP DOOR EXIT	**FOR PARATROOP DOOR EXIT**	**FOR PARATROOP DOOR EXIT**
	4. Floor Heat and Air Conditioning Master Switches - OFF	
3. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	5. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1)	5. Paratroop Doors - "CLEARED TO OPEN" (P), "OPEN" (LM 1) ***NOTE*** Jump platforms will be checked for security prior to opening doors.
	6. Floor Heat and Air Conditioning Master Switches - AS REQUIRED - heating and air conditioning as required for comfort.	a. Air Deflectors - EXTENDED (LM 2, 1) ***NOTE*** If air deflectors fail to extend electrically, manual extension may be accomplished.
		b. Jump Platforms - EXTENDED (LM 2, 1)
	7. Slowdown Checklist - "COMPLETED" (LM 2, 1, E)	6. Slowdown Checklist - "COMPLETED" (LM 2, 1, E)

19.90. HALO/HAHO Airdrop Checklist—*One-Minute Advisory.

19.90.1. For jumpmaster-directed HALO drops, the scanner will turn on the green one minute prior to release point. Navigator will provide standard "GREEN LIGHT" call at jointly agreed release point. Cleared exists will be turned over to the jumpmaster(s) no later than the One-Minute Advisory.

NAVIGATOR	LOADMASTER
1. "CREW ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 2, 1)	1. "CREW ONE-MINUTE ADVISORY" (N), "ACKNOWLEDGED" (LM 2, 1)
	2. Jumpmasters - ADVISED (LM 2, 1)

CAUTION:

If an unsafe condition exists after the one-minute advisory, a no-drop will be called.

19.91. HALO/HAHO Airdrop Checklist—*HARP Checklist.

19.91.1. Navigator initiates HARP checklist by stating "TEN SECONDS," followed by "GREEN LIGHT" at release point. Countdown is optional. Scanner will position jump signal light switch.

NAVIGATOR	ENGINEER	LOADMASTER
1. "TEN SECONDS" - (N)	1. "TEN SECONDS" - (N)	1. "TEN SECONDS" - (N)
		2. Jumpmasters/Safety - ALERTED (LM 2, 1)
2. "GREEN LIGHT" - (N)	2. "GREEN LIGHT" - (N) Jump Signal Light Switch - ON (S)	3. "GREEN LIGHT" - (N)
		4. Status of Load - "ALL CLEAR" (LM) or "MALFUNCTION" (LM 1)
3. "RED LIGHT" - (N) ***NOTE*** State "RED LIGHT" at end of usable DZ or loadmaster's call of "ALL CLEAR."	3. "RED LIGHT" - (N) Jump Signal Light Switch - OFF (S)	5. "RED LIGHT" - (N) 6. Jumpmaster/Safety - WARNED (upon hearing or seeing Red Light)

19.92. HALO/HAHO Airdrop Checklist—*Post-Drop Checklist.

19.92.1. After completing airdrop, pilot not flying aircraft initiates post-drop checklist by stating "POST-DROP CHECKLIST." Initial escape will be at 160 KCAS until paratroop doors are closed. Loadmasters may initiate checklist on completing airdrop (red light). Comply with the following for HALO/HAHO racetrack patterns: accomplish asterisk (*) items of the post-drop checklist and accomplish the checklists items with an asterisk, starting at slowdown checklist.

PILOT	ENGINEER	LOADMASTER
*1. "POST-DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM 2, 1, E)	*1. "POST-DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM 2, 1, E)	*1. "POST-DROP CHECKLIST" (CP) "ACKNOWLEDGED" (LM 2, 1, E)
	*2. Floor Heat and Air Conditioning Master Switches - OFF	
FOR PARATROOP DOOR EXIT	**FOR PARATROOP DOOR EXIT**	**FOR PARATROOP DOOR EXIT**
		*2. Jump Platforms - AS REQUIRED (LM 2, 1)
		*3. Air Deflectors - AS REQUIRED (LM 2, 1) **WARNING** Prior to retracting air deflectors, primary loadmaster will visually or verbally ensure second loadmaster is clear of paratroop door. ***NOTE*** If air deflectors fail to retract electrically, manual retraction may be accomplished.
	*3. Paratroop Doors - "AS REQUIRED" (LM 1)	*4. Paratroop Doors - "AS REQUIRED" (LM 1)
*2. Flaps and Slats - "AS REQUIRED" (CP)	*4. Flaps and Slats - "AS REQUIRED" (CP)	5. Parachute Safety/Harness - AS REQUIRED (LM 2, 1)
3. Paratroop Air Deflector Switch - "SAFE" (CP)	5. Landing Gear Warning Horn C/B - CLOSED" (S) 6. Paratroop Air Deflector Switch - "SAFE" (CP)	6. Jump Platform Lights - AS REQUIRED (LM 2, 1)
	7. Jump Signal Caution Light Switch- "OFF" (S)	7. Cargo Compartment Lights - AS REQUIRED (LM 1)
	*8. Floor Heat and Air Conditioning Master Switches - ON	

HALO/HAHO Airdrop Checklist—*Post-Drop Checklist (continued).

PILOT	ENGINEER	LOADMASTER
4. Pressurization - "AS REQUIRED" (P)	9. Pressurization - "AS REQUIRED" (P) Pressurize as directed by pilot. 10. Post-Drop Checklist - "COMPLETED" (LM 2, 1, E)	8. Post-Drop Checklist - "COMPLETED" (LM 2, 1, E)
FOR RAMP EXIT	**FOR RAMP EXIT**	**FOR RAMP EXIT**
*5. Flaps and Slats - "AS REQUIRED" (CP) ***NOTE*** If additional passes are to be accomplished the flaps and slats may remain positioned or repositioned for the next drop.	11. Center Door and Ramp - "CLOSED" (LM 1) *12. Flaps and Slats - "AS REQUIRED" (CP) ***NOTE*** If additional passes are to be accomplished, flaps and slats may remain positioned or repositioned for the next drop.	9. Center Door and Ramp - "CLOSED" (LM 1) Position door control switch to CLOSE, then place to OFF 10. Parachute/Safety Harness - AS REQUIRED (LM 2, 1) 11. Pressure Door Side Seals - CHECKED/RETRACTED (LM 3, 1) - Ensure pressure door side seals are retracted. 12. "A" Valve Safety Guard - INSTALLED (LM 1)
		13. Pressure Door Upper Hinges - CHECKED (LM 2, 1) - Visually check that the pressure door upper hinges are selected and links are overcenter and against stop.
		14. Target Pin and Release Actuator - FULLY RETRACTED (LM 2)
6. Aft Cargo Doors' Switch - "AS REQUIRED" (CP)	13. Pressure Door - CLOSED AND LOCKED"(LM 1) 14. Aft Cargo Doors' Switch - "SAFE" (CP) 15 Jump Signal Caution Light Switch - OFF" (S) 16. Floor Heat and Air Conditioning Master Switch - ON 17. Landing Gear Warning Horn C/B - "CLOSED" (S) 18. Pressurization - "AS REQUIRED" (P) Pressurize as directed by the pilot. 19. Post-Drop Checklist - "COMPLETED" (LM 2, 1, E)	15. Pressure Door - "CLOSED AND LOCKED" (LM 1) a. Pressure door switch - DOWN and HOLD, then OFF (LM 1). b. Ramp locks and manual locking pins - CHECKED/ INSTALLED (LM 2, 1) - Before installing locking pins, visually inspect ramp locks to ensure upper shaft of yoke is seated in throat of hook. c. Pressure door side seals - EXTENDED (LM 3, 1) 16. Post-Drop Checklist - "COMPLETED" (LM 2, 1, E)

Chapter 20

AEROMEDICAL EVACUATION (AE)

Section 20A— General Information

20.1. Mission:

20.1.1. The primary function of the C-5 aircraft for AE is opportune transport of ill or injured DoD members and their dependents requiring medical support. These AE missions may be directed at any time. The C-5 aircraft will be used with the concurrence of the appropriate medical validating authority.

20.1.2. AE personnel will utilize the procedures in applicable AFI/H 11-2 and 41-series, in conjunction with this publication, to accomplish the AE mission.

20.2. Not used.

20.3. Waivers and Revisions:

20.3.1. Waivers. Use **Chapter 4** waiver protocol for AE related questions or waivers.

20.3.2. Revisions. Use **Chapter 1** protocol for improvement recommendations.

20.4. Aeromedical Evacuation Forms. Forms required will be per applicable AFI/H 11-2 and 41-series publications.

Section 20B—Aeromedical Evacuation Command and Control

20.5. Operational Control and Reporting of Aeromedical Evacuation Forces:

20.5.1. HQ AMC is lead command for AE. The aircraft commander is responsible for ensuring the safety of the flight crew, AE crew, and all patients and passengers. The MCD is responsible for providing medical care to the patients. In matters concerning flight safety, decisions of the aircraft commander are final; in matters of patient care, decisions of the MCD are final.

20.5.2. Operational control of AE missions is the same as for other airlift missions.

20.5.3. The AMC Command Surgeon (HQ AMC/SG) is responsible for providing standards and procedures concerning the treatment of patients in-flight, and for approval of any medical equipment used on AE missions.

20.5.4. The MCD will advise the aircraft commander when a patient's condition or use of medical equipment may affect aircraft operations.

20.5.5. The AEOO, if available, is responsible for supervising flight line execution of AE missions. The MCD is directly responsible for the safety and medical well being of patients on the aircraft and coordinates enplaning and deplaning procedures with the AEOO and supporting agencies.

20.6. Aircraft Commander Responsibilities:

20.6.1. Assist the MCD in obtaining patient support requirements based on local availability. The MCD will coordinate with the aircraft commander for integration of the flight and Aeromedical Evacuation Crew Members (AECM) for continuing missions in which no crew changes take place including en route transportation, dining, billeting, etc.

20.6.2. Brief the AE crew on the mission, flight plan, flight profile, and current threat (if applicable).

20.6.3. Maintain cabin altitude at the level requested by the GPMRC/TPMRC, tasking AE command element, or MCD.

20.6.4. Coordinate with the MCD to determine if any flight restrictions are necessary due to patient conditions and if passengers and cargo may be carried.

20.6.5. Coordinate with the MCD to insure mission required equipment is available/installed as necessary.

20.6.6. Advise the AECMs of intentions to start engines, taxi, itinerary changes, in-flight difficulties, etc.

20.6.7. Brief the MCD on additional responsibilities of the flight crew.

20.6.8. During Aeromedical Readiness Missions (ARM), coordinate with the Mission Clinical Coordinator (MCC) on planned simulated emergencies and training activities.

20.6.9. Patients or passengers may visit the flight crew compartment per **Chapter 5** of this instruction. The control of patients rests with the MCD, while control of the passengers is the responsibility of the flight crew, in conjunction with the MCD.

20.6.10. Transmit load messages and radio transmissions to GPMRC/TPMRC or tasking AE command element/ground personnel as requested by the MCD.

20.6.11. Coordinate Crash/Fire/Rescue (CFR) vehicle requirements when transiting airfields that are unfamiliar with AE requirements. CFR vehicle will stand by per AFI 32-2001, The *Fire Protection Operations and Fire Prevention Program*, and T.O. 00-25-172, *Ground Servicing of Aircraft and Static Grounding/Bonding*.

20.7. Flight Crew Responsibilities:

20.7.1. Assist the AE crew with aircraft systems.

20.7.2. Provide AECMs who are not qualified in the C-5 with information identified in **20.10.1.**

20.7.3. Coordinate an emergency evacuation plan with the MCD.

20.7.4. Operate aircraft systems, i.e., doors, ramps, emergency exits, etc.

20.7.5. Assist the AE crew as necessary, providing such assistance does not interfere with primary duties.

20.7.6. Operate galley and prepare food and beverages for food service provided to patients by AECMs.

20.7.7. Assist with aircraft configuration for AE operations.

20.7.8. Complete pre-flight/emergency briefings.

20.8. Aeromedical Evacuation Crew Responsibilities:

20.8.1. Primarily responsible for patient activities.

20.8.2. Assist flight crew/maintenance with aircraft configuration for AE operations.

20.8.3. Install and remove medical equipment/supplies.

20.8.4. Assist the loadmaster with observation and care of passengers when it doesn't interfere with primary duties.

20.8.5. The MCD or designated AECM should be on aircraft inter-phone (headset) for all phases of flight, and will be on aircraft inter-phone during critical phases of flight to include takeoff and landing.

20.8.6. If C-5 qualified/certified, provide AECMs who are not qualified/certified in the C-5 with information identified in paragraph **20.10.1**.

20.9. Patient Death in Flight. When a suspected death occurs in flight, the planned itinerary will not be interrupted if the next scheduled stop is a US military airfield. If the next stop is a civilian airfield that does not service a US military medical facility, or a foreign military airfield, that stop will be over flown (mission requirements allowing). Coordination with command and control agencies is essential. The GPMRC/TPMRC or tasking AE command element must ensure that the MTF anticipating the aircraft's arrival at the civilian/foreign military airfield is informed of the cancellation.

Section 20C—Aeromedical Evacuation Crew Complement and Management

20.10. Aeromedical Evacuation Crew Complement:

20.10.1. Aircrew Qualification. AECMs must be fully qualified on at least one of the following aircraft; the C-9, C-17, C-130, or C-141, and are authorized to log primary flight time while performing duties on AE missions. Prior to being utilized as a certified AECM on C-5 aircraft, AECMs must receive training as directed in AFI 11-2AEV1. A flight crewmember is ultimately responsible for emergency egress and cabin safety.

20.10.2. Crew Complement. A basic AE crew consists of two FNs and three AETs. An alert crew consists of one FN and two AETs. An augmented AE crew consists of one additional FN and AET. The group/squadron chief nurse can adjust the crew complement. The group/squadron chief nurse is the final authority for increasing or decreasing the number of AECMs assigned to AE missions. Physicians, nurses, medical technicians, or other personnel designated as medical attendants (i.e., Critical Care Air Transport Team (CCATT) members) to specific patients does not constitute an augmented crew and does not extend crew duty time. Basic crews will not be augmented after crew duty has started.

20.10.3. The appropriate GPMRC/TPMRC or tasking AE command element will notify the command and control agencies or flying organization operations officer of the AE crew complement for each AE mission on C-5 aircraft.

20.11. Aeromedical Evacuation Crew Management. Manage AECMs according to **Chapter 3** of this instruction.

Section 20D—Aeromedical Evacuation Aircrew Procedures

20.12. Checklists:

20.12.1. General. This instruction and AFI 11-215, set policy and provide guidance for the standardization of contents and maintenance of flight crew checklists. Checklists will be maintained per AFI 11-215 and applicable MAJCOM supplement.

20.12.2. Applicability. This AFI applies to all AECMs assigned to AMC and AMC-gained AE units. It also applies to theater assigned AECMs performing AE duties on the C-5 aircraft.

20.12.3. During all aircraft operations, AECMs will carry and use the guidance contained in their current abbreviated flight crew checklist.

20.12.4. Only MAJCOM/DO and SG approved inserts/briefings pertaining to crew positions will be kept in the abbreviated flight crew checklist binders.

20.12.5. Information in the AECM checklists will not be changed except by published revisions or changes.

SECTION 20E—Aeromedical Evacuation Airlift Operations

20.13. General:

20.13.1. Determining Factors. Consider the following factors when transporting patients on the C-5 aircraft; patient's diagnosis, condition, equipment, oxygen requirements, in-flight time, in-flight patient care requirements, and the number of medical personnel required. Emphasis must always be on providing quality and appropriate care while minimizing potential risks during transport.

20.13.2. Patient Load Planning Factors. The GPMRC/TPMRC or tasking AE command element determines the size/composition of the patient load on AE missions. AE mission planning factors will be per applicable AFI/H 11-2 and 41-series publications.

20.13.3. Patient Preparation. A flight surgeon, if available, will determine the patient’s suitability for AE on the C-5 aircraft. Medical authorities requesting the patient’s evacuation must be informed of the in-flight physical stress on the patient. If the MCD determines the patient’s medical condition is beyond the capability of the AE crew or aircraft, they will contact the GPMRC/TPMRC or tasking AE command element for further guidance. The MCD, in coordination with the appropriate theater medical validating authority, may refuse to accept any patient whose medical condition is beyond their capability. The MCD will advise the aircraft commander when a patient’s condition or use of medical equipment may affect aircraft operation.

20.13.4. Equipment for AE Missions. Prior to use onboard AE missions, all medical equipment must be tested and deemed air worthy, and then approved for use by HQ AMC/SGX. For those unique patient moves requiring equipment that has not met the above criteria, contact GPMRC/TPMRC or tasking AE command element. GPMRC/TPMRC or tasking AE command element will obtain approval prior to use onboard the aircraft (applies to that specific mission only). AECMs are responsible for all medical supplies and equipment.

20.13.5. Aircraft Security. See **Chapter 7** of this instruction.

20.14. En Route Diversions:

20.14.1. The MCD is the medical authority onboard all AE missions and has the responsibility to determine what is beneficial or detrimental to the patient(s). If a physician is onboard, as an attendant to a patient, they will make decisions involving that specific patient’s care and may be consulted for advice as appropriate. Specific guidelines are contained in applicable AFI/H 41-series.

20.14.2. Should a diversion become necessary due to a change in patient’s condition, the aircraft commander will make every effort to comply with the requests of the MCD. Establish communications with the responsible command and control agencies, who will relay the information to the appropriate GPMRC/TPMRC or tasking AE command element.

20.14.3. Should an en route diversion become necessary for reasons other than a change in patient’s

condition, the aircraft commander will coordinate with the MCD before deciding the point of landing. The welfare of the patients is a prime consideration in all such decisions; however, safety is the final determinant. The aircraft commander notifies the responsible command and control agencies of the diversion and requests the appropriate medical agencies be notified.

20.14.4. Normally, patients will be advised of changes in itinerary and reasons for the diversion.

20.14.5. If the MCD determines the diversion will be detrimental to a patient, or the aircraft commander determines the diversion to be unsafe, the command and control agencies will be advised and guidance requested.

20.14.6. ARMs are the primary means of preparing for AE airlift. These missions can be diverted to fulfill "real" versus "simulated" patient airlift requirements. All medical equipment/kits will be kept operationally ready at all times. The Portable Therapeutic Liquid Oxygen (PTLOX) system, when mission ready, will be filled with LOX. ***EXCEPTION:*** The PTLOX system, when mission capable, will be maintained with nitrogen IAW T.O. 15X-2-8-1, *Liquid Oxygen Converter Type CRU-87/U.*

20.14.7. Opportune Airlift. Opportune airlift is preferred to launching a special airlift aircraft. The appropriate GPMRC/TPMRC or tasking AE command element and airlift agency should direct the move. Use of opportune airlift is considered an unscheduled AE mission, and managed/reported in the same manner as any other AE mission, to include the change of the mission number when patient(s) is/are onboard. AECMs on these missions will either be qualified/certified or under supervision while gaining qualification/certification in the affected aircraft.

20.15. Ground Operations.

20.15.1. Engines should be shut down during enplaning and deplaning of patients.

20.15.2. Enplaning and Deplaning Considerations:

20.15.2.1. Courier compartment. Only ambulatory patients may be transported in the courier compartment. Remember to evaluate patient's ability to ambulate, as they must climb two sets of steep angled stairs.

20.15.2.2. Troop Compartment. Both litter and ambulatory patients can be transported in the troop compartment. Load litter patients via an elevator truck or high rise lift truck through the #6 service door. Remember to evaluate ambulatory patient's ability to ambulate, as they must climb two sets of steep angled stairs.

20.16. Refueling Operations.

20.16.1. Refueling normally begins after deplaning patients are off the aircraft and prior to enplaning that station's patients. This minimizes the number of souls on board in case of an emergency. Servicing will be per AFI 32-2001 and T.O. 00-25-172.

20.16.2. Concurrent servicing may be accomplished with patients onboard provided:

20.16.2.1. The Chief Servicing Supervisor (CSS) coordinates with all personnel involved prior to beginning concurrent operations.

20.16.2.2. Prior to starting concurrent servicing, the total number of patients, passengers, and crew on board the aircraft, will be given to the fire department.

20.16.2.3. Loading ramps/stairs are in place for immediate use and exits are opened for egress.

20.16.2.4. The aircraft is thoroughly ventilated.

20.16.2.5. At least two AECMs (one must be a FN) remain onboard to observe patients and assist patients in the event of an egress.

20.16.3. If cabin lights, lavatories, electrical power to operate medical equipment and aircraft interphone are operating prior to refueling, use may continue during servicing operations. Only those systems, switches or electrical circuits needed to operate equipment to sustain life, may be turned on and used during refueling.

20.16.4. Patients and passengers will not enter or exit the aircraft during servicing. Crewmembers may enter or exit the aircraft only when performing essential duties associated with the concurrent servicing operation.

20.16.5. A member of the flight crew must be positioned in the passenger compartment and have intercom contact with the CSS during refueling operations.

20.16.6. Activities around the aircraft will be kept to a minimum during the refueling process. Onload/offload patient and passenger baggage prior to or after refueling.

20.17. Aircraft Pressurization. Normally altitude restrictions are passed from the GPMRC/TPMRC or tasking AE command element to command and control agencies for flight planning purposes. The MCD will advise the aircraft commander of any new cabin altitude or rate of cabin altitude change restrictions during the pre-flight briefing update.

20.18. Aircraft Configuration.

20.18.1. On opportune AE missions, configure the aircraft during pre-flight.

20.18.2. Litter Support Provisions. None on this aircraft. Three (3) passenger seats may be broken over so a litter can be secured to their backs using standard cargo straps. Coordinate with loadmaster prior to securing litters.

20.18.3. Available litter spaces and ambulatory seating will depend on the aircraft cabin's mission configuration.

20.18.4. Electrical Power. Secure an AE-approved electrical frequency converters to the cargo compartment floor. Distribute power via the Electrical Cable Assembly Set (ECAS) to either the courier or troop compartments (as applicable).

20.18.4.1. Courier compartment - secure frequency converter near fuselage station 1320 (if accessible) and route the ECAS cord(s) through the floor escape hatch.

20.18.4.2. Troop compartment - secure the frequency converter near fuselage station 1820 (if accessible) and route the ECAS cord(s) up the side of the troop ladder.

20.18.5. Therapeutic Oxygen. None on this aircraft. Use the PTLOX system, the Therapeutic Oxygen Manifold System (TOMS), or compressed oxygen cylinders.

NOTE:

The PTLOX system requires up to 300-feet of additional oxygen connecting hose (DISS receptacle to DISS plug) per patient, a DISS plug-to-plug adapter, and a pressure compensated flow meter configured with a DISS receptacle (identical to flow meters used on C-141 aircraft). Use of a Minilator may fulfill these requirements.

20.18.5.1. PTLOX system for the courier compartment: secure the PTLOX system in the cargo compartment and distribute oxygen via oxygen connecting hoses from the PTLOX system through the floor escape hatch.

20.18.5.2. PTLOX system for the troop compartment: secure the PTLOX system in the cargo compartment and distribute oxygen via oxygen connecting hoses from the PTLOX system up the side of the troop ladder.

NOTE:

The TOMS operates from the aircraft oxygen recharger outlet. Coordinate with flight crew prior to use.

20.18.5.3. TOMS for the courier compartment: connect the TOMS to the recharger outlet across from the crew work or dining table.

20.18.5.4. TOMS for the troop compartment: connect the TOMS to the recharger outlet on the right fuselage across from the troop ladder.

20.18.5.5. Compressed oxygen cylinders for courier compartment: secure cylinders in the closet across from courier seat.

20.18.5.6. Compressed oxygen cylinders for troop compartment: secure cylinders to the troop ladder guard.

20.18.6. Patient and passenger emergency oxygen is available on the aircraft. Patients and passengers will use the applicable passenger emergency oxygen system.

20.18.6.1. AE units will not maintain MA-1 portable oxygen bottles. MA-1 portable oxygen bottles must be functionally located to ensure proper maintenance, servicing, and storage. Dash 21 / Alternate Mission Equipment (AME) shops ensure MA-1 portable oxygen bottles are serviceable and properly maintained and stored. Dash 21 / AME shops ensure a sufficient number of MA-1 portable oxygen bottles are delivered to the aircraft to meet scheduled AE mission requirements.

20.18.7. AECMs will have portable oxygen available. AECMs will use an MA-1 portable oxygen bottle, or equivalent, which will be secured near their assigned seat.

20.18.8. Do not secure aircraft or medical equipment adjacent to an emergency exit in a manner that will prevent or impede egress.

20.18.9. Life Preservers. MB-1 flotation devices should be used for litter patients. If unavailable, use the Adult/Child life preserver for litter patients.

20.18.10. Patients not normally transported on the C-5 aircraft:

20.18.10.1. Critical prognosis requiring extensive patient care and medical equipment, i.e. burns or multiple trauma.

20.18.10.2. Respiratory problems requiring large amounts of therapeutic oxygen, ventilator support, or frequent suctioning.

20.18.10.3. Patients with contagious illness.

20.18.10.4. Floor loaded patients with external devices dependent on gravity, i.e. foley catheters or chest drainage systems.

20.18.10.5. High-risk neonates without special medical supervision from a neonatal team.

20.19. Passengers and Cargo.

20.19.1. The aircraft commander, with the concurrence of the MCD, will ensure maximum aircraft utilization for passengers and cargo. Passenger restrictions based upon patient considerations will be identified when seats are released. At stations with a GPMRC/TPMRC or tasking AE command element, the AEOO/GPMRC/TPMRC or tasking AE command element will advise the appropriate command and control agencies on the number of seats available for passengers.

20.19.2. Cargo and passengers may be carried with patients unless a clear detriment to the health and well being of the patient or passengers can be demonstrated. The decision will be made by the MCD, considering the need for maximum utilization of the aircraft. Conflicts will be referred to the respective GPMRC/TPMRC or tasking AE command element for a decision.

20.19.3. Cargo will not be bumped except in unusual/abnormal cases, and only after the MCD has coordinated with the aircraft commander and notified the local GPMRC/TPMRC or tasking AE command element.

20.19.4. Do not move ambulatory patients to litters in order to provide seating for additional patients or passengers.

20.19.5. Hazardous cargo will not normally be transported aboard AE missions except in extreme circumstances.

20.20. Crash/Fire/Rescue (CFR).

20.20.1. Aircraft carrying patient(s) will be provided CFR protection per T.O. 00-25-172. Stand-by CFR vehicle is not necessary during normal operations. A CFR vehicle can be available upon request. The flight crew will coordinate CFR requirements.

20.20.2. At non-AMC bases, non-U.S. military bases, and civilian airfields, the controlling agency will coordinate the CFR coverage, as necessary. The request for CFR vehicle coverage may be denied. This will not prevent refueling operations from occurring.

20.21. AE Call Sign and Use of Priority Clearance.

20.21.1. For AE missions, use the call sign “Air Evac” followed by the five digit aircraft number (i.e., Air Evac 12345) or mission designator (as required by FLIP). Revert to standard call sign when the AE portion of the mission is completed.

20.21.2. The AE “priority clearance” will be used when carrying patients classified as “urgent” or “priority,” who require urgent medical attention. AE priority will only be used for that portion of the flight requiring expedited handling. Aircraft commanders will request priority handling if AE missions are experiencing long delays during takeoff or landing phases, that will affect a patient’s condition.

20.21.3. This does not allow use of AE priority status simply to avoid Air Traffic Control (ATC) delays, make block/departure times, or avoid inconveniences. ATC agencies do not question the motive when an AE priority is declared. Use this status judiciously.

20.22. Load Message.

20.22.1. At military bases, the flight crew will pass inbound load messages to the proper command and control personnel. At civilian airfields, ground control will be notified.

20.22.2. The MCD will complete an AF Form 3858**, C-130/C-141 Aeromedical Evacuation Mission Offload Message**, per procedures in applicable AFI/H 41-series.

20.23. Change in Patient Status. Change in patient status will be managed per applicable AFI/H 41-series.

20.24. Aerial Refueling (A/R). Aerial refueling is an option, which should be considered when planning urgent, or priority patient airlift missions. A/R is not desirable in all medical situations, and in some cases may be detrimental to patient(s). Approval of A/R must be obtained from HQ AMC/SG prior to mission set up.

Chapter 21

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21.1. This chapter not used for C-5 operations.

Chapter 22

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22.1. This chapter not used for C-5 operations.

Chapter 23

AIRCREW CHEMICAL OPERATIONS AND PROCEDURES

23.1. Wear of Aircrew Chemical Defense Ensemble (ACDE). Wearing the ACDE will constrain normal aircraft operations. The ACDE includes the newer Aircrew Eye-Respiratory Protection System (AERPS) above the shoulder system and the CWU-66/P or -77/P Integrated Aircrew Chemical Coverall (IACC). Procedures and equipment have been tested under restricted conditions, and "business as usual" will not be possible. Individual situations dictate what can and cannot be done. To properly adapt, aircrews must understand hazards involved and the limitations of their chemical defense equipment.

23.1.1. This chapter is intended to enhance other aircrew chemical defense training and provides the crewmember a basic understanding of utilizing ACDE in a chemical-biological threat area (CBTA). It combines information from technical orders and unit inputs to form a single source document.

23.1.2. This chapter briefly describes the nature of the chemical threat and agents that may be faced. Secondly, it discusses some of the situations and problems the aircrew may encounter in a CBTA. Preparatory actions and countermeasures are examined so the crewmember can make optimal use of the ACDE and fly the mission safely. While the information presented may need to be modified, the specific objectives of this chapter will help prepare the aircrew member for the unique challenges imposed by chemical weapons.

23.2. Factors Influencing the Chemical Warfare (CW) Agent Hazard:

23.2.1. The major instances in which a crew may be exposed to chemicals are through inhalation, absorption through the skin, eyes, and ingestion. Contaminated drink and food are considered harmful, but immediate concerns must be contamination avoidance to the maximum extent, limit exposure of the skin and eyes, as well as avoid breathing the contaminants. Factors affecting persistence are weather, agent physical characteristics, method of dissemination, droplet size, and the terrain.

23.2.2. Weather. Factors include temperature, wind, humidity, precipitation and atmospheric stability. For example, high winds and heavy rains reduce the contamination hazard. Conversely, lack of wind, overcast-skies, and moderate temperatures favor persistence.

23.2.3. Agent Dissemination. Disseminated as vapors, aerosols, or liquids. Solids seem unlikely, but agents may become solids at lower temperatures.

23.2.4. Agent Droplet Size. Persistence factor is determined by droplet size. Agents may be mixed with other chemicals ("thickeners"), and form large drops making removal more difficult.

23.2.5. Surface and Terrain. CW agent clouds tend to follow the terrain, flowing over countryside and down valleys. Chemicals persist in hollows, depressions, and other low areas. Rough terrain retards cloud movement. Flat countryside allows a uniform, unbroken cloud movement. Vegetated areas are more contaminated than barren terrain. Liquid agents soak into porous surfaces, making evaporation much slower than for nonporous surfaces.

23.3. Categories of Chemical Warfare Agents. CW agents having military significance may be categorized as nerve, blister, choking, and blood. Because they are produced biologically, toxins technically are not chemical agents. However, they are considered a potential CW threat.

23.4. Nerve Agents.

23.4.1. Military Significance. Nerve agents are the most lethal and fastest acting of the standard CW agents. These agents affect the nervous system and are highly toxic whether inhaled, ingested, or absorbed through the skin. Persistency ranges from hours to many days.

23.4.2. Symptoms of Exposure. Nerve agent exposure is difficult to distinguish. Normally, symptoms of nerve agent exposure appear in the following order. Initial exposure includes a runny nose, tightness of the chest, dimness of vision, and pinpointing of the pupils. These symptoms are usually followed by difficulty in breathing, drooling, involuntary defecation and urination. Finally, exposure will lead to confusion, drowsiness, convulsions, coma and death.

23.4.3. Onset of Symptoms. Lethal respiratory dosages will cause death in 1 to 10 minutes and liquid exposure to the eyes will kill almost as rapidly. Depending on factors such as the amount and type of nerve agent, absorption through the skin may cause death anywhere from 1 to 2 minutes to 1 to 2 hours. Nerve agents are retained by the body for an extended period; thus intermittent, cumulative exposure to low amounts can lead to the same ultimate effect as a single exposure to a higher amount.

23.4.4. Protection. The full protective ensemble is effective against nerve agents. When properly worn, the various chemical protective masks prevent inhalation of nerve agents. Both the aircrew coveralls and ground crew ensemble provide limited protection to the skin. All layers of the outer garment must be protected against saturation of liquids, chemical agents, water, or petroleum.

23.4.5. Antidotes/Prophylaxis. Antidotes are effective in combating effects of nerve agent exposure. These antidotes may be effective if given to a victim having advanced symptoms, and as long as the victim is made to continue breathing. People who use the antidotes must be seen by medical personnel and may not be combat-ready for several days. Currently, nerve agents are the only agents with an available field antidote. This antidote can be self-administered by the exposed individual or through self-aid buddy care. In addition, medical personnel have more specialized treatments available.

23.5. Blister Agents:

23.5.1. Military Significance. Blister agents are dispensed as vapors or liquids, and may be encountered as solids. These agents primarily affect the eyes, respiratory tract, and the skin.

23.5.2. Symptoms of Exposure. Placed on the skin, a drop the size of a pinhead can produce a blister one inch in diameter. This action is accentuated by moisture; hence, a more severe danger is present during periods of sweating. The groin and armpits, which tend to be sweaty, are especially susceptible to blister agents. Blister agents which come in contact with the eyes lead to redness, watering of the eyes, blurring of vision, sensitivity to light, and frequently, blindness. Inhalation causes serious damage due to burns and blisters to the mouth, nose, throat, and lungs. Incapacitation may last for days or weeks; aircrews will probably be unable to fly for indefinite periods. After hospitalization, complications from blister agent exposure can arise and may be fatal.

23.5.3. Onset of Symptoms. Blister agents are quickly absorbed through the skin. However, it usually takes several minutes (up to five minutes and as long as several hours) for the symptoms to appear. They act most rapidly in liquid form, but are also effective in vapor form.

23.5.4. Protection. The full protective ensemble is effective against blister agents. Exposed areas must be cleaned thoroughly immediately after exposure. Blister agents are easily transferred from contaminated surfaces, thus great care must be taken to avoid contact with any contamination.

23.6. Choking Agents:

23.6.1. Military Significance. These agents are disseminated as vapors and when inhaled affect the respiratory system by damaging the lungs. Persistence is very brief, and dissipate rapidly (within minutes) under most field conditions.

23.6.2. Symptoms of Exposure. Choking agents cause coughing, choking, tightness of the chest, nausea, headache, and watering of the eyes. Choking agents can be lethal, with death normally from the lungs filling with fluids, making breathing difficult or impossible.

23.6.3. Onset of Symptoms. Exposure to choking agents has an immediate effect. Victims experience slightly delayed effects, such as painful cough, breathing discomfort, and fatigue.

23.6.4. Protection. Both the aircrew and ground crew protective mask is extremely essential to protect against exposure; the entire protective ensemble should be used as directed.

23.7. Blood Agents:

23.7.1. Military Significance. Blood agents are usually dispensed as vapor or aerosol and inhaled. Under most field conditions they may briefly persist on target (up to 10 minutes).

23.7.2. Symptoms of Exposure. Exposure to a single breath of blood agent causes giddiness, headaches, confusion, and nausea. As dose increases, breathing becomes more difficult. The victim will have deep, uncontrollable breathing and cramps, then loss of consciousness. Death is certain if the victim receives no medical aid.

23.7.3. Protection. Blood agents are breathing hazards. The full ensemble is most effective because the mask provides the breathing protection needed.

23.7.4. Additional Threats. Blood agents will damage mask filters. All personnel must change mask filters at the earliest possible opportunity after a blood agent attack.

EXCEPTION: Filters installed in aircrew CRU-80/P filter packs will be removed and replaced by aircrew life support (ALS) personnel (AFSC 1T1X1).

23.8. Aircrew Operations. Performance of duties while wearing chemical defense equipment can be extremely physically and mentally demanding. Special preparation and crew coordination are required to operate under chemical conditions. The information presented here will enable the aircrew to successfully operate in a chemical environment by recognizing limits and exploiting the capabilities of the chemical defensive equipment.

23.8.1. Planning:

23.8.1.1. Non-flying Ground Operations. Ground operations can represent the highest threat to aircrew safety. Protection from enemy attacks and exposure to liquid chemical agents is paramount. Aircrew should be advised to limit activities to essential duties only, and to separate ground duties from air duties. The ground ensemble is designed for quick donning and heavier levels of concentrations that can be more evident during ground operations. The aircrew ensemble is designed for the unlikely event of light concentration levels, that could be found during flying operations and transmitted to and from the aircraft. Also, ACDE requires care during donning using "buddy dressing" procedures and ALS expertise during aircrew contamination control area (ACCA) processing.

23.8.1.2. Equipment Limitations. Due to thermal stress and the degraded performance associated with wearing of the ACDE, it is highly desirable to minimize the time and number of personnel

exposed to chemical agents. Aircrew members must be familiar with the limitations of the ACDE and properly plan their duties. ACDE is designed to protect against vapor agents only and the mask and hood assembly cannot be donned quickly in time of attack.

23.8.1.3. Body Temperature/Fluids Control. Heat stress and dehydration are serious hazards while wearing the ACDE. Aircrew members need to control perspiration rates and limit activities to essential duties only. The need to consciously slow the work pace while performing physical labor, share workloads and monitor each other's physiological condition is essential.

23.8.1.4. Breathing Restrictions. One of the inherent characteristics of the filter assembly is moderate breathing resistance. Normally, this is most noticeable during high flow rates. For example, during physical exertion, users should be aware of the possibility of hyperventilation. During flying operations resistance can be reduced by using the EMERGENCY position on the oxygen regulator. The valsalva maneuver cannot be performed while wearing the MBU-13/P mask, therefore alternate means such as yawning or chewing can be used. If these are unsuccessful, attempt to clear ears by holding the oxygen regulator in the TEST MASK position and forcefully exhale or yell against the regulator pressure. The new AERP mask/hood assembly incorporates a blower system that presents less-than-moderate breathing resistance. However, in the event of a blower system failure, aircrews will experience an increase in breathing resistance.

23.8.1.5. Limited Dexterity. Wearing three pairs of gloves restricts dexterity, therefore visual confirmation of switch selection/positioning becomes very important.

23.8.1.6. Restricted Communications. Normal communications are limited while wearing the chemical defense mask. Communications can be enhanced by using the mini-amplifier/speaker with the AERP and some of the newer ground masks may be issued with a built-in amplifier. Otherwise, visual signals and the aircraft's public address system can be used to compensate.

23.8.1.7. Peripheral Vision Limits. The aircrew chemical defense mask may reduce peripheral vision as much as 15 percent.

23.9. Limitations. Aircrews must be mentally prepared to face the dangers of chemical weapons. Flight planning must be thorough and aircraft commanders should emphasize chemical defensive operations during mission planning, hazards and countermeasures, plans for onload/offload in the event of a ground attack, and plans for the return leg in the event of a contaminated aircraft. Alternate scenario plans should also be considered in the event conditions change.

23.9.1. Fuel Requirements. Extra fuel may be needed to compensate for altitude restrictions as the result of chemical agent exposure. If the aircraft has contamination, follow procedures outlined in **Chapter 16**. During purge periods, the aircraft will be unpressurized. Although the aircrew can use the aircraft oxygen systems, passengers wearing the ground crew ensemble (GCE) cannot. This restricts the aircraft cruise altitude and increases fuel requirements.

23.9.2. Oxygen Requirements. Operating into a CBTA will increase oxygen requirements. The aircrew may be required to rely on the aircrew chemical defense mask and aircraft oxygen system to counter actual/suspected chemical contamination. Using the 100 percent oxygen setting offers the greatest protection in a contaminated environment. Appropriate oxygen reservoir levels must be planned to meet higher consumption rates. Use the aircraft -1 charts to calculate the required reservoir levels.

23.9.3. Mask/Filter Assembly Limitations. Wearing any of the chemical defense masks/filter

assemblies imposes the following limitations:

23.9.3.1 The mask/filter assembly prevents the detection of fumes from fuel, hydraulic fluid and oil.

23.9.3.2 The filter assembly will not protect the user against ammonia fumes and carbon monoxide gas.

23.9.3.3 The filter/mask assembly should not be used without an oxygen source in an oxygen deficient atmosphere.

23.10. ACDE Issue. Aircrews will be issued sized ACDE and GCE at home station. Aircrews will ensure their ACDE and GCE is available at all times while in a CBTA. During deployments, at least one ACDE and one GCE will be issued to each crewmember as directed by the unit commander or HQ AMC/TACC. ALS technicians will prepare and issue mobility ACDE "D" bags for aircrew members (Reference AMCI 11-301, *Aircrew Life Support (ALS) Program* (chapters 4 and 6). Mobility processing personnel will issue GCE "C" bags. Aircrew members will confirm the mobility bag contents and correct sizes.

23.11. Operations in a Chemical-Biological Threat Area (CBTA).

23.11.1. Establishing Threat Level. Aircrews should monitor command and control channels to ensure they receive the latest information concerning the destination's alert condition. Diversion of AMC aircraft to alternate "clean" locations may be required, unless operational necessity dictates. The local AMC Command and Control will direct aircrews to undergo medical pre-treatment for chemical exposure.

23.11.2. Protective Equipment Postures. Standardized USAF alert conditions and recommended ACDE requirements are listed below based on a chemical-biological threat.

***NOTE*:**

These alarms may be different based on the host country requirements.

23.11.2.1 "ALL CLEAR" Attack is not probable, nor is chemical-biological contamination present. Notification--Verbal; removal of warning flags/placards. ACDE requirements--equipment is issued, prepared for flying, and kept readily available. GCE requirements--equipment is issued, prepared, and readily available.

23.11.2.2. "ALARM YELLOW" Attack is probable. Notification--Verbal; posting of yellow warning flags/placards. ACDE requirements--if en route to fly or during flying operations, all components will be worn except mask and hood, gloves, overcape, and overboots. GCE requirements--appropriate components should be worn with the mask/hood immediately available commensurate with ground duties.

23.11.2.3 "ALARM RED" Attack is imminent or in progress. Notification--Verbal; posting of red warning flags/placards; one minute warbling tone on siren (3 seconds on-1 second off). ACDE requirements--full ACDE will be worn for flying duties. GCE requirements--full ensemble should be worn commensurate with ground duties. Personnel will take immediate cover.

23.11.2.4 "ALARM BLACK" Contamination is suspected or present. Notification--Verbal; “Gas - Gas - Gas”; posting of black warning flags/placards; warbling tone on siren (1 second on-1 second off). ACDE requirements--full ensemble will be worn. GCE requirements--full ensemble will be worn commensurate with ground duties. Personnel will remain indoors or under liquid agent cover.

23.12. Donning Equipment. Aircrew will don ACDE based on the alarm condition. Use the "buddy dressing" procedures, and refer to AMCVA 36-2206, *ACDE Donning Checklist* (projected to be AMCVA 11-303), to ensure proper wear. When wearing the ACDE, Atropine and 2 PAM Chloride auto injectors will be kept in the upper left flight suit pocket. This standardized location will allow personnel to locate the medication should an individual be overcome by nerve agent poisoning. M-9 paper on the flight suit will facilitate detection of liquid chemical agents and ACCA processing. M-9 paper should be placed on the flight suit prior to entering a CBTA when an alarm “yellow” or higher has been declared. When inbound to CBTA, prior to descent, the aircraft commander will ensure crew and passengers don appropriate protective equipment IAW arrival destination's mission oriented protective posture (MOPP) level and brief aircrew operations in the CBTA. As a minimum, this briefing will include: flight deck isolation, oxygen requirements, air conditioning system requirements, CW clothing requirements, ground operations and MOPP levels.

23.13. Ground Operations.

23.13.1. Off/Onload Considerations. Extreme care must be exercised to prevent contamination of aircraft interiors during ground operations, particularly to the flight deck area. Reduce the number of personnel entering the aircraft. Contaminated engine covers, safety pins and chocks will not be placed in the aircraft unless sealed in clean plastic bags. Onload cargo will be protected prior to and while being transported to the aircraft. Protective covers will be removed just prior to placing the cargo on the aircraft. It is the user's responsibility to determine and decontaminate equipment in his/her charge. Aircrew members entering the aircraft will remove plastic overboots and overcape portions of the aircrew ensemble and ensure flight/mobility bags are free of contaminants and placed in clean plastic bags. Aircrew exiting aircraft into a chemically contaminated environment will don plastic overboots and overcape prior to leaving the aircraft.

23.13.2. Physiological Factors. Aircraft commanders must be very sensitive to the problems resulting from physical exertion while wearing ACDE. The aircraft commander should consider factors such as ground time, temperature and remaining mission requirements when determining on/offload requirements. Individuals involved should be closely monitored for adverse physiological effects.

23.13.3. Communications. Conducting on/offloading operations while wearing the complete ACDE complicates communications capability. Use the mini-amplifier/speaker or the aircraft public address system and augment with flashlight and hand signals as required.

23.13.4. Passenger/Patients. A path should be decontaminated between the aircraft and the ground transportation vehicle to reduce interior decontamination when loading/unloading passengers/patients.

23.14. Chemical Attack During Ground Operations. If an attack (Alarm Red) occurs during on/offloading operations or transport to and from aircraft, take immediate cover away from the aircraft/vehicle. Follow "buddy dressing" procedures to ensure proper donning of ACDE prior to flight.

NOTE:

Aircrews should don the ground crew protective chemical mask and protective helmet, consistent with circumstances and duties. Aircrews could be expected to forward information concerning medical aid, damage estimates, unexploded ordinance. Appropriate information may be forwarded via the aircraft radios to the controlling agencies.

23.15. Crew Rest Procedures. Operational necessity may require the aircrew to rest/fly in a contaminated CBTA. If the mission is not being staged by another aircrew or pre-flight crews are not

available, the aircrew will normally pre-flight, load, and secure the aircraft prior to entering crew rest. The departing aircrew will perform necessary crew preparations and pre-flight briefings, then report to the ACCA for processing with assistance from ALS personnel who will assist aircrews donning ACDE prior to reassuming flying duties. If possible, aircrew transport should be provided in a covered vehicle. Aircrews should avoid pre-flighting aircraft prior to departure to prevent contamination to themselves and the aircraft. As aircrews proceed to fly they will require assistance from ground support personnel in removing their aircrew protective overcape and overboots prior to entering the aircraft.

23.16. Outbound with Actual/Suspected Chemical Contamination. Venting Aircraft/Removing ACDE Components: With actual/suspected vapor contamination, the aircraft must be purged for 2 hours using Smoke and Fume Elimination procedures. To ensure no liquid contamination exists, a close inspection of aircrew, passenger ensembles, and cargo will be conducted using M-8 and M-9 detection paper. M-8 and M-9 detection paper only detects certain liquid agents and will not detect vapor hazards. Above the shoulder ACDE may be removed only if the presence of vapor/liquid agents are not detected or suspected. The aircrew must take every precaution to prevent spreading of liquid contaminants, especially on the flight deck area. The best course is to identify actual/suspected contamination and physically avoid those areas for the remainder of the flight and keep cargo compartments cool. If an aircrew member or passenger has been in contact with liquid contaminants, all personnel aboard the aircraft will stay in full ACDE/GCE until processed through their respective contamination control area (CCA).

23.17. Communicating Down-line Support. Pass chemical contamination information through command and control channels when inbound. This information will be used to determine if a diversion flight is required or decontamination teams are needed. Report the physical condition of any crew/passengers who are showing chemical agent symptoms and whether they are wearing chemical defense ensembles.

23.18. Contamination Control Areas (CCA) Procedures. Aircrews will proceed to the ACCA for processing. Ground personnel will report to the ground crew contamination control area (GCCA) for processing. All personnel will remove protective clothing IAW established procedures located in respective CCAs.

NOTE:

Because of the technical characteristics of life support/flying equipment and mission essential aircrew resources, an ACCA is required to ensure minimum exposure to contaminates. GCCAs are generally used to process ground crew personnel and typically are subject to potentially higher concentration levels. The ACCA is equipped and manned by trained ALS personnel to process aircrews and decontaminate their equipment.

23.19. Work Degradation Factors. Work timetables need to be adjusted to minimize thermal stress caused by wearing the ACDE. Aircrews must weigh all factors when performing in-flight and ground duties. The following are degradation factors for wearing full GCE, and may also be used to represent the Task Time Multipliers for the ACDE. To estimate how much time it takes to perform a task or operation, (1) take the Task Time Multiplier (Figure 23.1)for the appropriate Work Rate and ambient air temperature and (2) multiply it by the time it normally takes to perform the task. For example, given a heavy work rate and an air temperature of 70F, the crewmember should expect a normal one hour task to take 2.1 hours while wearing ACDE. A more extensive discussion of this subject is found in AFMAN 32-4005, *Personnel Protection and Attack Actions.*

23.20. Forms Prescribed. AF Form 4097, **C-5 Fatigue Tracking**; AF Form 4054, **Performance and Fuel Management Log**; AF Form 4098, **TOLD Card Worksheet (C-5)**; AF Form 4099, **TOLD Card (C-5)**; AF Form 4053, **INS Flight Plan and Log**; AF Form 4052, **C-141/C-130/C-5/C-17 Air Refueling Computation;** AF Form 4101, **Relay Logic Landing Gear Malfunctions**; AF Form 4050 (AMC Form 95), **Tactical Fuel Mission Planning (C-5)**; AF Form 4079, **C-5 Airdrop Data**; AF Form 4127, **Passenger Information Cards (Flight Deck C-5 Galaxy)**; AF Form 4126, **Passenger Information Cards (Troop Compartment C-5 Galaxy).**

Figure 23.1. Task Time Multipliers.

Work Rate	Temperature		
	20-49F	50-84F	85-100F
Light	1.2	1.4	1.5
Moderate	1.3	1.4	3.0
Heavy	1.7	2.1	5.0

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Attachment 1

GLOSSARY OF REFERENCES AND SUPPORTING INFORMATION

References.

DoD 4515.13R, *Air Transportation Management*

AFPD 10-9, *Lead Operating Command Weapon Systems Management*

AFPD 11-2, *Aircraft Rules and Procedures*

AFPD 10-21, *Air Mobility Lead Command Roles and Responsibilities*

AFI 10-403, *Deployment Planning*

AFI 11-202V1, *Aircrew Training*

AFI 11-202V2, *Aircrew Standardization/Evaluation Program*

AFI 11-202V3, *General Flight Rules*

AFI 11-215, *Flight Manual Procedures*

AFI 11-209, *Air Force Participation in Aerial Events*

AFI 11-218, *Aircraft Operations and Movement on the Ground*

AFI 11-401, *Flight Management*

AFI 11-2C-5V1, *C-5 Aircrew Training*

AFI 11-2C-5V2, *C-5 Evaluation Criteria*

AFJI 11-204, *Operational Procedures for Aircraft Carrying Hazardous Materials*

AFI 11-299, *Nuclear Airlift Operations*

AFI 21-101, *Maintenance Operations and Management Policy*

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AFI 36-2903, *Dress and Personal Appearance of Air Force Personnel*

AFI 48-104, *Medical and Agricultural Foreign and Domestic Quarantine Regulations for Vessels, Aircraft, and Other Transports of the Armed Forces (Joint)*

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AFI 91-202, *The US Air Force Mishap Prevention Program*

AFI 91-204, *Safety Investigations and Reports*

AFI 37-124, *The Information Collections and Reports Management Program; Controlling Internal, Public, and Interagency Air Force Information Collections*

AFMAN 10-206, *Operational Reporting*

AFOSH Standard 127-100, *Aircraft Flight Line - Ground Operations and Activities*

AFMAN 11-217, *Instrument Procedures*

AFM 2-50, *USA/USAF Doctrine for Joint Airborne and Tactical Airlift Operations*

AFM 3-4, *Tactical Air Operations-Tactical Airlift*

AFM 11-1, *Air Force Glossary of Standardized Terms*

AFI 10-1101, *Operations Security*

AFI 13-217, *Assault Zone Procedures*

AFI 11-231, *Computed Air Release Point Procedures*.

AMCR 3-2, Volume II (S), *Threat Environment Concepts*

AMCP 55-25, *Tactical Mission Considerations*

AMCMAN 11-211 (S), *Tactical Employment, C-5, C-17 and C-141*

AMCI 11-301, *Aircrew Life Support (ALS) Program*

FLIP, (DoD Flight Information Publications)

MCM 3-1, Volume I (S), *General Planning and Employment Considerations*

JCS Pub 1-02, *DoD Dictionary of Military and Associated Terms*.

AFPAM 10-709V1, *US Message Text Formatting*

AFPAM 91-212, *Bird Aircraft Strike Hazard (BASH) Management Techniques*

Abbreviations and Acronyms

ACDE – Aircrew Chemical Operations and Procedures

ACF – Acceptance Check Flight

AGE – Aircraft Ground Equipment

AOR – Area of Responsibility

APU – Auxiliary Power Unit

A/R – Air Refueling

ARCT – Air Refueling Control Time

ASRR – Airfield Suitability and Restriction Report

ATC – Air Traffic Control

BAM - Bird Advisory Model

BRNAV – Basic Area Navigation Airspace

C2 – Command and Control

CDT – Crew Duty Time

CG – Center of Gravity

CW – Chemical Warfare

CCA – Contamination Control Area

CECR – Crew Enhancement Crew Rest

CFP – Computer Flight Plan

COE – Certification of Equivalency

CSS – Chief Servicing Supervisor

CVR – Cockpit Voice Recorder

DCS – Defense Courier Service

DH – Decision Height

EAL – Entry Access List

EMCON – Emission Option

ETA – Estimated Time of Arrival

ETE – Estimated Time En route

ETIC – Estimated Time in Commission

ETP – Equal Time Point

FCB – Flight Crew Bulletin

FAF – Final Approach Fix

FCF – Functional Check Flight

FCIF – Flight Crew Information File

FDP – Flight Duty Period

FIR – Flight Information Region

FMC – Fully Mission Capable

FMS – Flight Management System

FOD – Foreign Object Damage

FOL – Forward Operating Location

FSO – Flying Safety Officer

GPS – Global Positioning System

HATR – Hazardous Air Traffic Report

ICS – Infant Car Seat

IFF – Identification Friend or Foe

INS – Inertial Navigation System

LRC – Long Range Cruise

MAF – Mobility Air Forces

MARSA – Military Assumes Responsibility for Safe Altitude

MC – Mission Capable

MCD – Medical Crew Director

MDS – Mission Design Series (e.g., C-5)

ME – Mission Essential

MEL – Minimum Equipment List

MOB – Main Operating Base

MNPS – Minimum Navigation Performance Specifications

MSL – Mean Sea Level

NDB – Non Directional Beacon

NEW – Net Explosives Weight

NM – Nautical Mile

NOTAM – Notice to Airmen

OIS – Obstacle Identification Surface

PDO – Publication Distribution Office

PF – Pilot Flying

PNF – Pilot Not Flying

PMCR – Post Mission Crew Rest

PPR – Prior Permission Required

PMSV – Pilot to Meteorologist Service

PSN – Proper Shipping Name

RNP – Required Navigation Performance

ROE – Rules of Engagement

RRFL – Required Ramp Fuel Load

RVSM – Reduced Vertical Separation Minimum

SAAM – Special Assignment Airlift Mission

SID – Standard Instrument Departure

SIGMET – Significant Meteorological Information

SPR – Single Point Refueling

STM – Supplemental Training Mission

TOLD – Take off and Landing Data

Terms.

Aeromedical Evacuation (AE). Movement of patients under medical supervision between medical treatment facilities (MTF) by air transportation.

Aeromedical Evacuation Coordination Center (AECC). A coordination center, within the joint air operations center's airlift coordination cell, which monitors all activities related to aeromedical evacuation (AE) operations execution. It manages the medical aspects of the AE mission and serves as the net control station for AE communications. It coordinates medical requirements with airlift capability, assigns medical missions to the appropriate AE elements, and monitors patient movement activities.

Aeromedical Evacuation Crew Member (AECM). Qualified Flight Nurse (FN) and Aeromedical Evacuation Technician (AET) performing AE crew duties.

Aeromedical Evacuation Operations Officer (AEOO). Medical Service Corps (MSC) officer or medical administrative specialist or technician (AFSC 4A0X1) assigned to the AE system to perform duties outlined in applicable Air Force policy directives, instructions, 41-series handbooks, and this AFI.

Aeromedical Readiness Mission (ARM). Training missions using simulated patients to prepare for the wartime/contingency movement of patients.

Airdrop. Aircraft is considered to be performing airdrop when heavy equipment platforms, container delivery system containers, parachutists, etc., are scheduled to be released from the aircraft in flight.

Air Force Satellite Communication (AFSATCOM). Satellite communications system capable of 75 bits per second (BPS) record message traffic.

Air Force Component Commander (AFCC). In a unified, sub-unified, or joint task force command, the Air Force commander charged with the overall conduct of Air Force air operations.

Airlift. Aircraft is considered to be performing airlift when manifested passengers or cargo are carried.

Air Mobility Control Center (AMCC). Provides global coordination of tanker and airlift for AMC and operationally reports to the AMC TACC. Functions as the AMC agency that manages and directs ground support activities and controls aircraft and aircrews operating AMC strategic missions through overseas locations.

Air Mobility Element (AME). The air mobility element is an extension of the Air Mobility Command Tanker Airlift Control Center deployed to a theater when requested by the geographic combatant commander. It coordinates strategic airlift operations with the theater airlift management system and collocates with the air operations center whenever possible.

Air Reserve Component (ARC). Refers to National Guard Bureau and AFRC forces, both Associate and Unit Equipped.

Air Route Traffic Control Center (ARTCC). The principal facility exercising en route control of aircraft operating under instrument flight rules within its area of jurisdiction. Approximately 26 such centers cover the United States and its possessions. Each has a communication capability to adjacent

centers.

Air Traffic Control (ATC). A service operated by appropriate authority to promote the safe, orderly and expeditious flow of air traffic.

Allowable Cabin Load (ACL). The maximum payload which can be carried on an individual sortie.

AMC History System (AHS). Database that compiles and stores tanker activity input by line units.

Augmented Crew. Basic aircrew supplemented by additional qualified aircrew members to permit in-flight rest periods.

Aviation Into-Plane Reimbursement (AIR) Card. A credit card that can be used to purchase aviation fuels, related fuel supplies and ground services at commercial airports where no DoD or Canadian Into-Plane contract exists.

Bird Watch Condition (BWC) Low. Normal bird activity [as a guide, fewer than 5 large birds (waterfowl, raptors, gulls, etc.) or fewer than 15 small birds (terns, swallows, etc.)] on and above the airfield with a low probability of hazard. Keep in mind a single bird in a critical location may elevate the BWC to moderate or severe.

Bird Watch Condition Moderate. Increased bird population (approximately 5 to 15 large birds or 15 to 30 small birds) in locations that represent an increased potential for strike. Keep in mind a single bird in a critical location may elevate the BWC to moderate or severe.

Bird Watch Condition Severe. High bird population (as a guide, more than 15 large birds or 30 small birds) in locations that represent an increased potential for strike. Keep in mind a single bird in a critical location may cause a severe BWC.

Block Time. Time determined by the scheduling agency responsible for mission accomplishment for the aircraft to arrive at (block-in) or depart from (block-out) the parking spot.

Blue Bark. US military personnel, US citizen civilian employees of the Department of Defense, and the dependents of both categories who travel in connection with the death of an immediate family member. It also applies to designated escorts for dependents of deceased military members. Furthermore, the term is used to designate the personal property shipment of a deceased member.

Border Clearance. Those clearances and inspections required to comply with federal, state, and local agricultural, customs, immigration, and immunizations requirements.

Category I Route. Any route that does not meet the requirements of a category II route, including tactical navigation and over water routes.

Category II Route. Any route on which the position of the aircraft can be accurately determined by the overhead crossing of a radio aid (NDB, VOR, TACAN) at least once each hour with positive course guidance between such radio aids.

Chalk Number. Number assigned to a complete load and to the transporting carrier.

Charge Medical Technician (CMT). Aeromedical Evacuation Technician (AET) responsible for ensuring completion of enlisted aeromedical crew duties.

Circular Error Average (CEA). Indicator of the accuracy of an airdrop operation. It is the radius of a circle within which half of the airdropped personnel and items or materiel have fallen.

COIN ASSIST. Nickname used to designate dependent spouses accompanying dependent children and dependent parents of military personnel reported missing or captured who may travel space available on military aircraft for humanitarian purposes on approval of the Chief of Staff, United States Army; Chief of Staff, United States Air Force; Chief of Naval Operations; or the Commandant of the Marine Corps.

Combat Control Team (CCT). A small task organized team of Air Force parachute and combat diver qualified personnel trained and equipped to rapidly establish and control drop, landing, and extraction zone air traffic in austere or hostile conditions. They survey and establish terminal airheads as well as provide guidance to aircraft for airlift operations. They provide command and control, and conduct reconnaissance, surveillance, and survey assessments of potential objective airfields or assault zones. They also can perform limited weather observations and removal of obstacles or unexploded ordinance with demolitions.

Command and Control (C2). The exercise of authority and direction by a properly designated commander over assigned and attached forces in the accomplishment of the mission. Command and control functions are performed through and arrangement of personnel, equipment, communications, facilities, and procedures employed by a commander in planning, directing, coordinating, and controlling forces and operations in the accomplishment of the mission.

Command and Control Center (CCC, C2). Each CCC provides supervision, guidance, and control within its assigned area of responsibility. For the purpose of this AFI, CCCs include operations centers, command posts, air mobility elements, tanker airlift control elements (TALCE), air mobility control centers, and tanker task forces.

Command and Control Information Processing System (C2IPS). Computer-based information transmission and information handling for command and control functions associated with the Director of Mobility Forces (DIRMOBFOR), air mobility element (AME) fixed units, and tanker airlift control elements (TALCE). Interfaces to and automatically updates the Global Decision Support System (GDSS).

Conference Skyhook. Communication conference available to help aircrews solve in-flight problems that require additional expertise.

Contingency Mission. Mission operated in direct support of an OPORD, OPLAN, disaster, or emergency.

Critical Phase of Flight. Takeoff, air refueling, low level, air drop, approach, and landing.

Deadhead Time. Duty time for crewmembers positioning or de-positioning for a mission or mission support function and not performing crew duties.

Department of Defense Activity Address Code (DoDAAC). A six position, alpha-numeric code assigned to identify the unit, activity, or organization within DoD that owns the aircraft.

Designated Courier. Officer or enlisted member in the grade of E-5 or above of the US Armed Forces, or a Department of State diplomatic courier, selected by the Defense Courier Service (DCS) to accept, safeguard, and deliver DCS material as directed. A primary aircrew member should be used as a courier only as a last resort.

Desolate Terrain Missions. Any mission in excess of one hour over desert, tropical, or jungle terrain (not to include flights conducted over the CONUS.

Deviation. A deviation occurs when takeoff time is not within -20/+14 minutes of scheduled takeoff

time. Scheduled takeoff time may be adjusted to make good an air refueling control time (ARCT). Notify controlling agency prior to takeoff to adjust the scheduled takeoff time.

Direct Instructor Supervision. Supervision by an instructor of like specialty with immediate access to controls (for pilots, the instructor must occupy either the pilot or copilot seat).

Director, Mobility Forces (DIRMOBFOR). Individual in command of all mobility forces within a designated area or for a designated operation. In overseas theaters, the DIRMOBFOR is normally responsible for theater mobility force management. The Air Force component commander exercises operational control of assigned or attached mobility forces through the DIRMOBFOR. The DIRMOBFOR monitors and manages assigned mobility forces operating in theater.

Distinguished Visitor (DV). Passengers, including those of friendly nations, of star or flag rank or equivalent status, to include diplomats, cabinet members, members of Congress, and other individuals designated by the DoD due to their mission or position (includes BLUE BARK and COIN ASSIST)

Double Blocking. When an aircraft is required to block-in at one parking spot, then move to normal parking for final block-in. The extra time required for double blocking will be taken into account during mission planning/scheduling. To compensate for double blocking on departure, the aircrew "legal for alert time" may be adjusted to provide additional time from aircrew "show time" to departure. When double blocking is required on arrival, the aircrew's entry into crew rest will be delayed until post-flight duties are complete.

Drop Zone (DZ). A specific area upon which airborne troops, equipment, or supplies are airdropped.

Drop Zone (DZ) Entry Point. Fixed point on a DZ run-in course where an aircraft or formation of aircraft may safely begin descent from instrument flight rules (IFR) en route altitude to IFR drop altitude. The DZ entry point is a maximum of 25 nautical miles (NM) prior to the DZ exit point according to Federal Aviation Administration (FAA) waiver for IFR airdrop operations. Formation descent will not begin until the last aircraft in formation is at or past the DZ entry point.

Drop Zone (DZ) Exit Point. Fixed point on the DZ escape flight path centerline, established during pre-mission planning, at which the formation will be at the minimum IFR en route altitude. Calculate the exit point based on three-engine performance at airdrop gross weight. This point will be planned no less than 4 NMs track distance beyond the DZ trailing edge.

Due Regard. Operational situations that do not lend themselves to International Civil Aviation Organization (ICAO) flight procedures, such as military contingencies, classified missions, politically sensitive missions, or training activities. Flight under "Due Regard" obligates the military aircraft commander to be his or her own air traffic control (ATC) agency and to separate his or her aircraft from all other air traffic. (See FLIP General Planning, section 7.)

Equal Time Point (ETP). Point along a route at which an aircraft may either proceed to destination or first suitable airport or return to departure base or last suitable airport in the same amount of time based on all engines operating.

Estimated Time of Arrival (ETA).

Estimated Time to Block In (ETB). ETA + 15 minutes.

Estimated Time of Departure (ETD).

Estimated Time In Commission (ETIC). Estimated time that is required to complete required

maintenance.

Execution. Command-level approval for initiation of a mission or portion thereof after due consideration of all pertinent factors. Execution authority is restricted to designated command authority.

Familiar Field. An airport in the local flying area at which unit assigned aircraft routinely perform transition training. If required for training, each operations group commander will designate familiar fields within their local flying area.

Firm Scheduled Return Time (FSRT). Scheduling tool used by air mobility units to predict when crews will return to home station. FSRT for active duty, ANG, and AFRC is defined as SRT plus 24 hours.

Fix. A position determined from terrestrial, electronic, or astronomical data.

Global Decision Support System (GDSS). AMC's primary execution command and control system. GDSS is used to manage the execution of AMC airlift and tanker missions.

Global Patient Movement Requirements Center (GPMRC). A joint activity reporting directly to the Commander in Chief, US Transportation Command, the Department of Defense single manager for the regulation of the movement of uniformed services patients. The Global Patient Movement Requirements Center authorizes transfers to medical treatment facilities of the Military Departments of the Department of Veterans Affairs and coordinates intertheater and inside continental United States patient movement requirements with the appropriate transportation component commands of US Transportation Command.

Ground Time. Interval between engine shut down (or arrival in the blocks if engine shutdown is not scheduled) and next takeoff time.

Hazardous Cargo or Materials (HAZMAT). Articles or substances that are capable of posing significant risk to health, safety, or property when transported by air and classified as explosive (class 1), compressed gas (class 2), flammable liquid (class 3), flammable solid (class 4), oxidizer and organic peroxide (class 5), poison and infectious substances (class 6), radioactive material (class 7), corrosive material (class 8), or miscellaneous dangerous goods (class 9). Classes may be subdivided into divisions to further identify hazard, i.e., 1.1, 2.3, 6.1, etc.

Instructor Supervision. Supervision by an instructor of like specialty. For critical phases of flight, the instructor must occupy one of the seats or stations, with immediate access to the controls.

In-Place Time (IPT). Time when an aircraft and crew are at an operating base and prepared to load for the mission.

Interfly. The exchange and/or substitution of aircrews and aircraft between Mobility Air Forces (MAF) including crewmembers and/or aircraft from AETC, ACC, PACAF, and AMC-gained ANG and AFRC forces.

Joint Airborne/Air Transportability Training (JA/ATT). Continuation and proficiency combat airlift training conducted in support of DoD agencies. Includes aircraft load training and service school support. AMC headquarters publishes JA/ATT tasking in AMC OPORD 17-76, annex C, appendix 1.

Jumpmaster. The assigned airborne-qualified individual who controls parachutists from the time they enter the aircraft until they exit.

L-Band SATCOM. 600 bit per second (BPS) satellite communications (SATCOM) system contracted through the International Maritime Satellite Organization (INMARSAT), used primarily for command

and control. The system consists of a satellite transceiver, a laptop computer, and a printer.

Loading Time. In airlift operations, a specified time, established jointly by the airlift and airborne commanders concerned, when aircraft and loads are available and loading is to begin.

Local Training Mission. A mission scheduled to originate and terminate at home station (or an off-station training mission), generated for training or evaluation, and executed at the local level.

Maintenance Status.

A-1: No maintenance required.

A-2 (Plus Noun): Minor maintenance required, but not serious enough to cause delay. Add nouns that identify the affected units or systems, i.e. hydraulic, ultra high frequency (UHF) radio, radar, engine, fuel control, generator, boom or drogue, etc. Attempt to describe the nature of the system malfunction to the extent that appropriate maintenance personnel will be available to meet the aircraft. When possible, identify system as mission essential (ME) or mission contributing (MC).

A-3 (Plus Noun): Major maintenance. Delay is anticipated. Affected units or systems are to be identified as in A-2 status above.

A-4: Aircraft or system has suspected or known biological, chemical, or radiological contamination.

Medical Crew Director (MCD). Flight Nurse (FN) responsible for supervising patient care and aeromedical evacuation crewmembers (AECMs) assigned to aeromedical evacuation (AE) missions. On missions where an FN is not onboard, the senior Aeromedical Evacuation Technician (AET) will function as MCD.

Mission. The dispatching of one or more aircraft to accomplish one particular task.

Mission Advisory. Message dispatched by command and control agencies, liaison officers, or aircraft commanders advising all interested agencies of any changes in status affecting the mission.

Mission Clinical Coordinator (MCC). A qualified MCD or CMT, in addition to the basic crew and instructors and flight examiners. Responsible for coordinating training activities on ARMs.

Mobility Air Force (MAF). Forces assigned to mobility aircraft or MAJCOMs with operational or tactical control of mobility aircraft.

Modified Contour. Flight in reference to base altitude above the terrain with momentary deviations above and below the base altitude for terrain depressions and obstructions to permit a smooth flight profile.

Off-Station Training Flight. A training flight that originates or terminates at other than home station that is specifically generated to provide the aircrew experience in operating away from home station. Off-station trainers will not be generated solely to transport passengers, cargo, or positioning/de-positioning crewmembers.

Operational Control (OPCON). Transferable command authority that may be exercised by commanders at any echelon at or below the level of combatant command. Operational control is inherent in combatant command (command authority). Operational control may be delegated and is the authority to perform those functions of command over subordinate forces involving organizing and employing commands and forces, assigning tasks, designating objectives, and giving authoritative direction necessary to accomplish the mission. Operational control includes authoritative direction over all aspects

of military operations and joint training necessary to accomplish missions assigned to the command. Operational control should be exercised through the commanders of subordinate organizations. Normally this authority is exercised through subordinate joint force commanders and Service and/or functional component commanders. Operational control normally provides full authority to organize commands and forces and to employ those forces as the commander in operational control considers necessary to accomplish assigned missions. Operational control does not, in and of itself, include authoritative direction for logistics or matters of administration, discipline, internal organization, or unit training.

Operational Missions. Missions executed at or above TACC level.

Operational Risk Management (ORM). A logic-based, common sense approach to making calculated decisions on human, materiel, and environmental factors before, during, and after Air Force operations. It enables commanders, functional managers and supervisors to maximize operational capabilities while minimizing risks by applying a simple, systematic process appropriate for all personnel and Air Force functions

Opportune Airlift. Transportation of personnel, cargo, or both aboard aircraft with no expenditure of additional flying hours to support the airlift.

Originating Station. Base from which an aircraft starts on an assigned mission. May or may not be the home station of the aircraft.

Over Water Flight. Any flight that exceeds power off gliding distance from land.

Pathfinder Aircraft. Aircraft that precedes the main force to the objective area. Its primary functions are to airdrop the CCT and provide current weather information to the main force.

Patient Movement Categories.

Urgent: Patients who must be moved immediately to save life, limb, or eyesight, or to prevent complication of a serious illness.

Priority: Patients requiring prompt medical care that must be moved within 24 hours.

Routine: Patients who should be picked up within 72 hours and moved on routine/scheduled flights.

Permit to Proceed. Aircraft not cleared at the first US port of entry may move to another US airport on a permit to proceed issued by customs officials at the first port of entry. This permit lists the requirements to be met at the next point of landing, i.e. number of crew and passengers, cargo not yet cleared. Aircraft commanders are responsible to deliver the permit to proceed to the customs inspector at the base where final clearance is performed. (Heavy monetary fines can be imposed on the aircraft commander for not complying with permit to proceed procedures.)

Phoenix Penguin. AMC OPORD detailing working procedures necessary to operate special assignment airlift missions (SAAM) in support of the US Antarctic Program. HQ AMC/DOO oversees the OPORD, 15AF is mission command with execution directed from TACC. Also, referred to as Operation DEEP FREEZE.

Point of No Return. A point along an aircraft track beyond which its endurance will not permit return to its own or some other associated base on its own fuel supply.

Point of Safe Return. Most distant point along the planned route from which an aircraft may safely return to its point of departure or alternate airport with required fuel reserve.

Positioning and De-positioning Missions. Positioning missions are performed to relocate aircraft for the purpose of conducting a mission. De-positioning missions are made to return aircraft from bases at which missions have terminated.

Quick Stop. Set of procedures designed to expedite the movement of selected missions by reducing ground times at en route or turnaround stations.

Ramp Coordinator. Designated representative of the command and control center (CCC) whose primary duty is the coordination of ground handling activities on the ramp during large scale operations.

Scheduled Return Time (SRT). Scheduling tool used by air mobility units to predict when crews will return to home station. It allows force managers to plan aircrew availability and provide crews visibility over monthly flying activities. AMC and AMC-gained aircrews (except those on standby at home station) will have an SRT established on their flight orders.

Scheduled Takeoff Time. Takeoff time is established in the schedule or OPORD. For air aborts and diversions, this will be engine shut down time (or arrival in the blocks if engine shutdown is not scheduled) plus authorized ground time. Early deviation does not apply to aborts or diversions unless the mission is formally rescheduled by current operations.

Significant Meteorological Information (SIGMET). Area weather advisory issued by an International Civil Aviation Organization (ICAO) meteorological office relayed to and broadcast by the applicable air traffic control (ATC) agency. SIGMET advisories are issued for tornadoes, lines of thunderstorms, embedded thunderstorms, large hail, severe and extreme turbulence, severe icing, and widespread dust or sand storms. SIGMETs frequently cover a large geographical area and vertical thickness. They are prepared for general aviation and may not consider aircraft type or capability.

Special Assignment Airlift Mission (SAAM). Funded airlift that cannot be supported by channel missions because of the unusual nature, sensitivity, or urgency of the cargo or that requires operations to points other than the established channel structure.

Stabilization Point. Point on the DZ run-in course at which the lead aircraft should plan to be stabilized at drop altitude and airspeed. This point will be planned to be at least 6 NMs prior to the point of impact.

Stations Time (Airborne). Specified time when parachutists will be seated in the aircraft with seat belts fastened. Normally, this time is 5 minutes prior to Air Force Stations time.

Stations Time (Air Force). In air transport operations, the time at which crews, passengers, and cargo are to be on board and ready for the flight. Normally 45 minutes prior to takeoff time.

Tactical Event. Airdrop, low level, formation, threat avoidance approaches/departures, and night vision goggle (NVG) operations.

Tanker Airlift Control Center (TACC). The Air Mobility Command direct reporting unit responsible for tasking and controlling operational missions for all activities involving forces supporting US Transportation Command's global air mobility mission. The Tanker Airlift Control Center is comprised of the following functions: current operations, command and control, logistics operations, aerial port operations, aeromedical evacuation, flight planning, diplomatic clearances, weather, and intelligence.

Tanker Airlift Control Element (TALCE). Team of qualified Air Force personnel established to control, coordinate, and function as an Air Force tanker and airlift command and control (C2) facility at a base where normal AMC C2 facilities are not established or require augmentation. TALCEs support and

control contingency operations on both a planned and no-notice basis.

Tanker Task Force (TTF). Force of tanker aircraft assembled and tasked to perform a specific function.

Theater Patient Movement Requirements Center (TPMRC). Organization within a specific theater of operations responsible for coordination of intra- and inter-theater patient movement.

Time Out. Common assertive statement used to voice crewmember concern when safety may be jeopardized.

Training Mission. Mission executed at the unit level for the sole purpose of aircrew training for upgrade or proficiency. Does not include operational missions as defined in this AFI.

Transportation Working Capital Fund (TWCF). Formerly known as Defense Business Operations Fund-Transportation (DBOF-T). Part of the Air Force Working Capital Fund (AFWCF). Normally used to cover costs that can be recovered from an air mobility customer. Examples include TDY costs, site surveys of TALCE or airlift unit deployment bed down locations, airlift unit level mission planning expenses, and support or contract costs for deployed TWCF units/personnel.

Unilateral. Operations confined to a single service.

Unit Move. Unit relocation in support of a contingency or exercise deployment/redeployment. These moves are made to desired areas of operation or to designated locations, and are made in accordance with a troop movement schedule.

Zero Fuel Weight. Weight, expressed in pounds, of a loaded aircraft not including wing tank fuel. All weight in excess of the maximum zero fuel weight will consist of usable fuel.